

THE IRON AGE

A Review of the Hardware, Iron Metal Trades.

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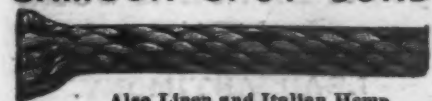
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See Page 30.

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motive Magazine." Second edition. 8vo.
Cloth. 200 pages, 37 illustrations, 16 half-
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For sale by David Williams Co., 232 William St., N.Y.

THE IRON AGE

THURSDAY, MAY 5, 1904.

The Torbensen Gear Gasoline Auto Truck.

That the automobile has ceased to be a pleasure vehicle merely, and is entering upon a field of business usefulness, is apparent from the increasing number of auto-delivery wagons and trucks to be seen about our city streets. Although at present the power driven pleasure vehicles outnumber the commercial motor vehicles probably in a ratio of 100 to 1, and although the number of pleasure motor cars is increasing as fast as the existing factories can turn them out, yet ultimately and before very long it is believed the ratio will change in favor of the power driven business car. It is not to be understood that the use of the motor car, as a pleasure

of this truck may, therefore, be of interest. Its dimensions are as follows:

Length of body over all.....	9 feet 6 inches.
Width of body over all.....	3 feet 6 inches.
Height of platform.....	2 feet 6 inches.
Weight of fuel and water.....	1,150 pounds.
Carrying capacity (including driver).....	800 pounds.
Maximum speed on level road.....	15 miles per hour.
Maximum speed on hills.....	5 miles per hour.

The power equipment consist of an 8 horse-power two-cylinder vertical gasoline motor suspended from the steel frame midway between the front and rear axles, with the driving shaft at right angles to the rear axle. This gives ample clearance between the top of the motor and the floor of the car, and permits of a level and unobstructed floor,



Fig. 1.—The General Appearance of a Small Torbensen Gear Gasoline Auto Truck.

vehicle, is likely to decline; on the contrary, it will keep on growing greater and greater every year; but when the users of vehicles for transportation of merchandise and material become satisfied of the saving which can be effected by the use of the automobile the motor car industry will expand as scarcely any industry ever has before. The saving in dollars and cents is not the only determining factor in the estimation of the progressive man of business when considering the automobile, but rather as an economizer of time, and as such the automobile is without competition in transportation. Inasmuch as time is the element of most importance whatever tends to effect its economy is bound to find a welcome.

The little truck shown herewith belongs to the class of business vehicles. It was designed especially for the use of a building contractor and house carpenter in Orange, N. J. This suburban town containing so many homes of wealthy New Yorkers covers a large territory, and where a contractor has building operations going on in widely separated places at the same time, requiring not only his presence several times a day at each place, but also the frequent delivery of mill work and material, the value of a light swift motor car, capable of carrying moderate loads, becomes apparent. A short description

very desirable in carrying long strips of timber or other material. A large hinged trap door in the floor over the motor allows ready access to same when necessary for oiling or adjusting.

The most interesting part in connection with this truck, however, is the system of transmission and control between motor and driving wheels, which after the constant use of three seasons has proven itself reliable and efficient, though simple. The whole transmission is contained in the rear axle, a plan view of which is shown in Fig. 2, and consists of the "gear," shown in elevation in Fig. 3 and in section in Fig. 4, the axle proper and the driving shaft with pinions, the latter meshing with internal gears fastened to the hubs of the driving wheels.

The "gear" has two forward speeds and reverse. It is contained in a cylindrical cast iron case which fits into an annular ring forming part of the axle. It consists of a friction clutch, a planetary gear for slow speed, a bevel gear drive for forward and reverse motion, with ball thrust bearings, all of which run in a bath of oil. The motor is connected through a set of universal and telescope joints giving the utmost freedom of motion to the forward end of the "gear" shaft. The vertical lever shown on this shaft engages the low speed when in the forward

position, through the planetary gears, and when in the opposite position engages the high speed clutch, at the same time releasing the planetary gears, thus giving a direct drive on the high gear.

The rear axle proper is of double tubular trussed construction, of great stiffness and strength. The end pieces

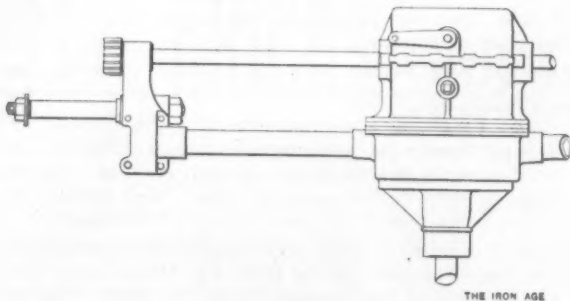


Fig. 2.—Plan of the Transmission Gearing.

of this axle consist of steel castings, into which are inserted the axle studs on which the wheels revolve, and the journals for the driving shafts which carry the pinion shown on end of axle in Fig. 2. The wheels have plain hard phosphor bronze bearings, the axles are case hardened and ground, all driving gears are hardened and fitted on squares instead of keys, and as they are in dust proof

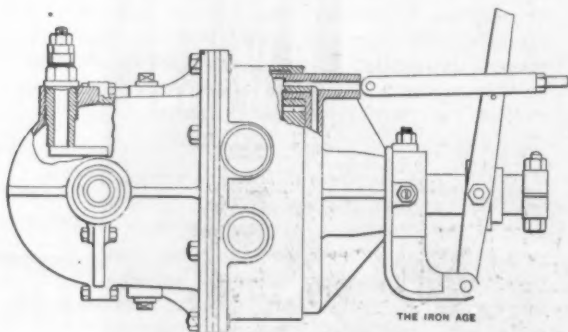


Fig. 3.—Elevation of the "Gear."

tight cases, and liberally lubricated, they last indefinitely and work smoothly and efficiently.

It remains only to be said that the internal drive gears, not shown, which are bolted to the hubs of the wheels, and engage with pinions of the driving shafts, are fitted with powerful external band brakes, and therefore, serve the double purpose of driving gears and brake drums.

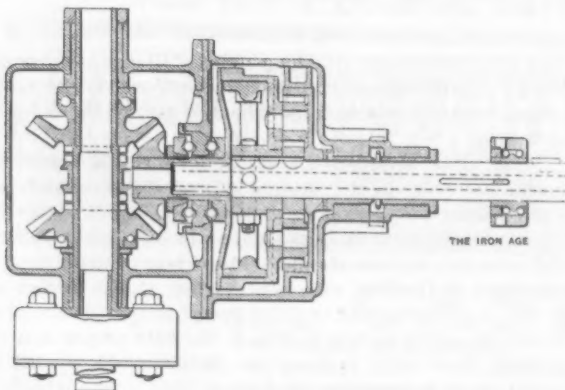


Fig. 4.—Section of the "Gear."

As a summary, the advantageous features of the power equipment of this auto-truck are the following: Great flexibility and freedom of motion between the source of power and the driving mechanism without the use of chains; an all spur gear transmission, with every driving gear incased and run in a bath of oil; undivided rear axle possessing great strength; clutches incased and working in oil, making starting smooth and easy and without

jerks, so destructive to the working parts. This system of transmission is known as the Torbensen "gear," and the truck was built by the Torbensen Gear, Incorporated, Bloomfield, N. J.

The Use of High Percentages of Mesaba Ores in Coke Blast Furnace Practice.

Edward A. Uehling of New York has contributed the following to the discussion of the paper by W. A. Barrows, Jr., before the American Institute of Mining Engineers:

The method of filling a blast furnace has always been one of the most important elements in its successful management, and Mr. Barrows strikes the keynote of proper filling in his statement: "The purpose in moving the siliceous ore or coarse ore barrow one pocket each charge is to destroy the continuity of the gas currents ascending through the fine ores, and to reduce the pressure incident thereto, so as to prevent in a measure the dust from being carried over into the downcomer." The stock must be charged into the furnace in such a manner that the current of ascending gas cannot readily plow its way through in a straight line. Homogenous filling is compatible only with very moderate driving.

From a study of the chemical reactions which take place in a blast furnace I came to the conclusion, many years ago, that stratification would be more conducive to fuel economy and regularity of working than the more or less thorough commingling of the ore, fuel and flux which was the method then generally in vogue. The theoretical considerations which led me to advocate and to practice the stratified filling, always with very materially improved results, were based on the principal chemical reactions which constitute the process of reduction in the blast furnace. The iron ore, Fe_2O_3 , for example, can be and is reduced according to the following reactions:

- (1) $\text{Fe}_2\text{O}_3 + 3 \text{C} = 2 \text{CO} + 2 \text{Fe}$.
- (2) $\text{Fe}_2\text{O}_3 + 3 \text{C} = 3 \text{CO}_2 + 2 \text{Fe}$.
- (3) A combination of reactions (1) and (2).

It is evident that the best possible results, so far as fuel economy and process of smelting are concerned, is obtained when the maximum amount of the carbon charged is burned to carbon monoxide before the tuyeres, and the ore is reduced by the carbon monoxide thus formed. The heat developed in thus burning the carbon in the hearth produces the necessary temperature in the zone where it is required to melt the iron and the accompanying slag; the carbon monoxide formed, with accompanying nitrogen, in their upward course preheating the descending material, thus offering the greatest possible opportunity for the reaction indicated in the equation (2) and permitting the gases to escape with a maximum content of carbon dioxide. On the other hand, if the ore is reduced by direct contact with the carbon—that is, according to the equations (1) or (3)—the hearth is robbed of so much fuel, which is detrimental to the process of smelting, and all the carbon monoxide so formed passing off as such, enriches the escaping gas and is to that degree prejudicial to fuel economy.

From these considerations it follows that it must be conducive to fuel economy and improved smelting to reduce the opportunity of direct reduction as much as possible. To accomplish this, I proposed to fill the coke and ore in separate strata, making the layers as heavy as is consistent with existing conditions, and so far as I am aware, this method of charging a blast furnace had not previously been proposed, much less systematically practiced.

When Stratified Filling Was First Tried.

It so happens that stratified filling was first tried and its virtues were proved more than 20 years ago in the same furnace, then known as Douglas Furnace No. 1, in which Mr. Barrows proved the method of filling described in his paper. I had been connected with the Douglas furnaces in 1880, but was at the time chemist for the Bethlehem Iron Company. Mr. Briorty, furnace superintendent at Bethlehem, did not feel inclined to try any experiment, but George Kelly, manager of the Douglas furnaces, to whom I explained the method and rea-

sons for likelihood of success, took it up at once, and I can do no better than quote from his letters, in which he reports the results obtained.

DOUGLAS FURNACES, PIERCE, KELLY & CO.,
SHARPSVILLE, MERCER CO., PA., September 23, 1884.
E. A. Uehling, Esq., Bethlehem, Pa.

DEAR SIR: You no doubt think it about time that you should hear some sort of a report of the results of trial of your method of filling. Two weeks ago yesterday we began filling 12 barrows of coke at a time, and 12 barrows of ore with 6 barrows of lime, which gives us an average depth of say 12 to 15 inches. We have kept this up steadily since then with very gratifying results. The first week the furnace was on clinder mixture and the second week on all ore mixtures, and in each case there has been a most marked "improvement over any work the furnace has done in the past years. We find improvement not alone in increase of burden, but in almost every other essential feature—viz., uniformity in quality and quantity of product, increased production and decrease in quantity of flux (the latter feature I had not thought of). The trial showing results so far as follows: Increase in burden, 12 per cent.; increase in production, 10 per cent.; decrease in flux, from 5 to 8 per cent., and increase in quantity of No. 1 iron, 25 per cent.

The above certainly shows a very marked improvement, and if the use of still larger charges will show a corresponding improvement, it cannot help being of great advantage. I can see but one drawback to it, and one that may prevent the increase of the charges to the size you propose in a depth of 3 to 4 feet, and that is the increased pressure. We now notice an increase of $\frac{1}{2}$ to $\frac{3}{4}$ pound over our former average pressure; this, of course, comes from having so much fine ore in a body, and we might not have this increase if coarser ores were used, but if the pressure should increase relatively with the size of the charges it is a question whether we can get them up to the maximum, but a trial will settle that point. I want to give the matter a thorough test, and therefore make each stage of it sufficiently long to fully demonstrate the results, so that, when we are through with it, we can tell just the point to stop at. I shall, therefore, run a week at a time on each increased charge hereafter, and will add each time six barrows, so that it may be some little time yet before we can fully determine the matter. Within the next day or two I will increase to 18 barrows, and at the end of a week note results and advise you, and will continue to do so at the end of each stage.

Very truly,

GEO. D. KELLY.

SHARPSVILLE, MERCER CO., PA., December 27, 1884.
E. A. Uehling, Esq., Bethlehem, Pa.

DEAR SIR: Your favor of the 17th duly received. Our No. 1 furnace is still running and doing so well that we have concluded to bank instead of blowing out, believing the lining capable of service for a long time yet with the exception of a few feet from the top. We are still following your method of filling with results equally as good as first advised you of. The writer owes you an apology for not writing you as promised. A trial of over three months fully confirms the results, and in one particular even better than we then stated—that is, the diminished quantity of flux required, which will average on all kinds of mixtures from 10 to 12 per cent.. We have not yet decided in regard to the sectional bell.

Very truly,

PIERCE, KELLY & CO.

I described this method of filling in a publication mentioned below (Stevens Institute Indicator, 1884), and the description was copied by several of the technical journals at the time. I have used it at all the furnaces that have come under my management, and the change from unstratified or indifferently stratified filling to stratification of the charge invariably resulted in a marked reduction of coke consumption, increased production, greater regularity in running and a higher quality of product.

The Effect of Stratified Filling.

The chemical reason brought forward above in favor of this method of charging no doubt has an appreciable share in the resulting fuel economy, but far more important is the fact that stratification does break up the continuity of the ascending gas currents.

The strata of coke, being so much more open than those of the ore, permit the gas pressure to equalize itself laterally, thus preventing concentrated vertical currents, which have a tendency to become more and more localized and intense, and are the major cause of nine-tenths of the irregularities occurring in the interior of the furnace.

It is evident that filling according to this method means lowering the fuel separately. The charges must be heavy enough to form distinct strata. No hard and fast rule can be laid down which would cover all conditions. The size of the furnace, physical properties of the ore, and blast pressure available are all factors to be considered. The coke is lowered first; if the hopper is large enough, preferably in one charge; if not, then in two or more equal charges. The limestone should be

dumped evenly around the bottom of the hopper. The ore is charged evenly over the limestone, and both are lowered into the furnace together. Judgment must be used in shifting the different ores composing the mixture around the hopper. Consecutive strata of ore should vary vertically as much as possible, both physically and chemically.

This method of filling, like everything human, no doubt, has its limitations. With the bell and hopper charging apparatus, now in universal use, ores having an angle of repose differing greatly from that of the coke do not lend themselves well to stratified charging since they will not cover the fuel evenly, and by producing vertically superposed annular rings of greater resistance may tend to concentrate the currents of gas in place of destroying them, thus giving unsatisfactory results. I have not had the misfortune to be called upon to manage a furnace using Mesaba ores, and cannot, therefore, speak from experience with that particular ore; but in discussing this question recently with Mr. McDonald, general manager of the Ohio works of the Carnegie Steel Company, the above fact was first brought to my notice.

The method of heterogeneous filling described by Mr. Barrows, therefore, marks a step in advance and will, no doubt, be welcomed by many furnacemen whose troubles have been multiplied by the introduction of the Mesaba ores. Unfortunately, this method of filling is restricted to hand filled furnaces, thus leaving the problem still unsolved for the major part of the furnaces consuming Mesaba ore. Heterogeneous filling can evidently never be applied to automatically filled furnaces, whereas stratified filling might easily come to their rescue if proper distribution of the stock could be obtained. The only hope for relief seems, therefore, to rest on an invention that will accomplish the latter.

The *Farm Implement News*, Chicago, has issued No. 9 of its annual Buyers' Guide. This book is almost double the size of any previous issue, containing 418 pages. A new method of classifying names of manufacturers makes this book extremely valuable for reference, as it gives the names of all agricultural implement, vehicle, wind mill and pump manufacturers and related industries in every State alphabetically by States. The first part of the book is devoted to a classified list of the trade names of tools manufactured, and the last section to a miscellaneous directory of manufacturers. The book lists 7361 articles made in 1743 factories. It is bound in green buckram, and is a creditable piece of work in every way.

The Audit Company of New York have issued the sixth annual (1904) edition of the Directory of Directors in the City of New York, corrected to March 1, 1904. This edition has been increased by 100 pages over last year's issue, and is now double the size of the first (1898) edition. The Directory consists of an alphabetical list of directors or trustees with New York City addresses, followed by the names of the companies with which each is connected, and an appendix consisting of selected lists of corporations in banking, insurance, transportation, manufacturing and other lines of business, alphabetically arranged, accompanied in each case by the names of the company's principal officers and all its directors or trustees.

The comparatively new style of street paving with macadam, in which the stones are coated with tar, has been used with success in the city of Hamilton, Canada, and 8.68 miles were laid at a cost of \$145,000. The curb is of Portland cement concrete. The top surface of the road is finished with clean gravel, 2 gallons of tar being mixed with each cubic yard of gravel. The whole is thoroughly rolled. No repairs have as yet been made on any of the pavements laid within the last three years. The advantages of this class of pavement may be summed up as follows: Economy in construction, the average price, with labor at 18 to 20 cents per hour, being about \$1.08 per yard; good foothold for horses, and absence of dust—therefore, economy in cleaning and sprinkling.

The New Jones & Lamson Turret Lathe.

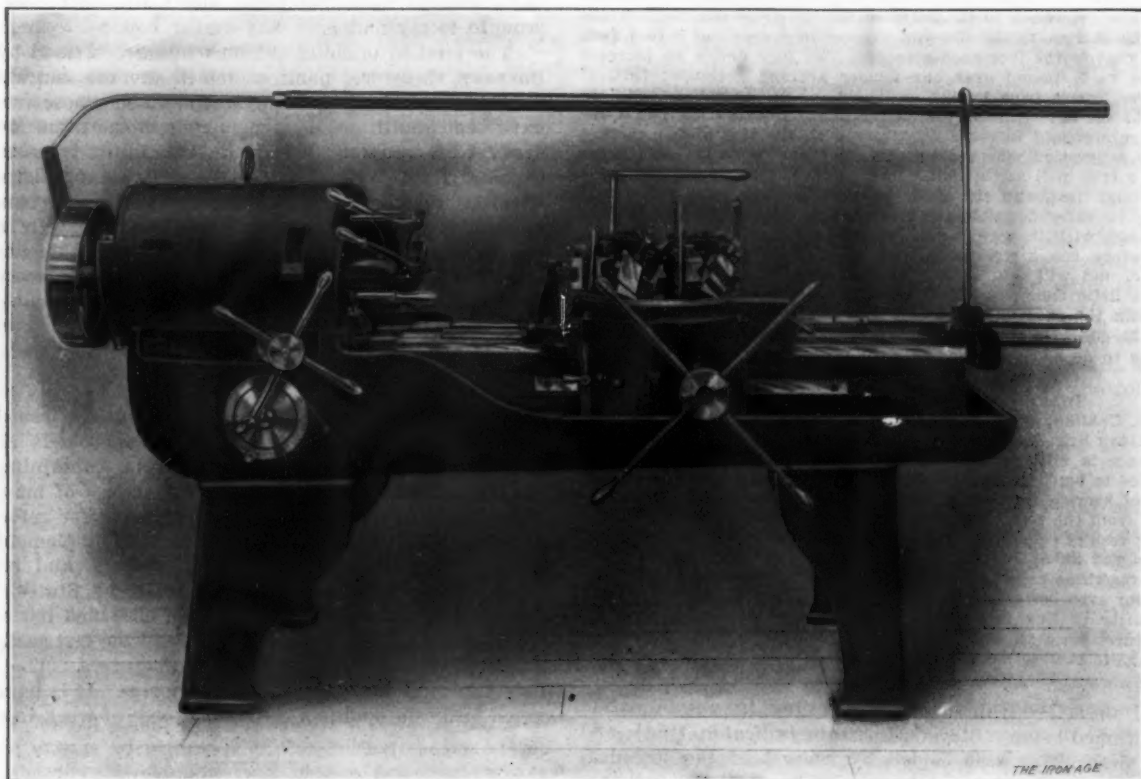
The flat turret lathe manufactured by the Jones & Lamson Machine Company, Springfield, Vt., has recently been redesigned so that it now has the appearance shown in the accompanying illustrations. Most of the changes are to be found in the bed and head. The turret is substantially as heretofore furnished, but embodies some minor changes in its construction, and that of the slide and the tools mounted on it.

As the head contains all the necessary gears for effecting changes of speed in both directions, the power for driving the lathe is received on a single pulley, which may be belted direct to a constant speed motor placed on the floor or ceiling or it may be belted to a single countershaft overhead. All the gears, clutches and bearings for the speed changing mechanism are held in a head stock having the form of a shallow pan, which contains oil, reaching the lower half of the running parts, insuring ample lubrication. The main bearings of the spindle are self adjusting, and are provided with a similar arrange-

accurate results for shoulder length, whereas, heretofore, the positive stop being 1-32 inch beyond the knock off for the feed in the usual operation, the feed would knock off and then the turret slide relieved would jump back, attended by a springing of all its parts, such that the tool would dig in and cut a slight groove just back of the shoulder. For nice work the operator would then take the time to move the turret slide up against the positive stop, holding it there until the turner had faced its full length. A new stop mechanism of the same form is used in connection with ten rotary stops for the sliding head.

The means for lubricating the turners and other tools is new and of special interest. Provision is made for the oil to come up through the turner casting—that is, the oil pump delivers into a pipe that is connected to the under side of the turret carriage, and the oil passes up through the turner that is in working position, issuing from a rectangular hole just above the cutting tool in a large but slowly moving solid stream. This does away with the troublesome swing joints and long pipes used heretofore.

The shipper rod running the entire length of the ma-



Front View or Working Side of the New Jones & Lamson Flat Turret Lathe.

ment for lubrication. The head stock mechanism is covered by a cast iron hood, conveniently removable when it is necessary to inspect the running parts. The head stock is mounted on guideways running across the machine, so that it is possible to give the work a cross feed relative to each tool on the turret, a feature which increases the range of chucking work. To insure the absolute return of the spindle to its correct central position, the head stock may be traveled in but one direction, being brought back against a positive stop in the opposite direction. Speed variation is also possible for the feeds of both the cross slide and the turret.

The present turret slide differs from the original in being provided with 12 stops, two for each position of the turret, either of which may be used in either direction. The handle at the rear end of the turret slide is so arranged that it can throw out all of the stops to move the turret beyond any one of them, and may also be employed to throw out either one of the two stops that are available for a given position on the turret. The feed stop mechanism for the turret is so arranged that the feed pulls the carriage forward with a maximum pressure against the positive feed stop, and holds it there firmly until disengaged by the operator. This insures the most

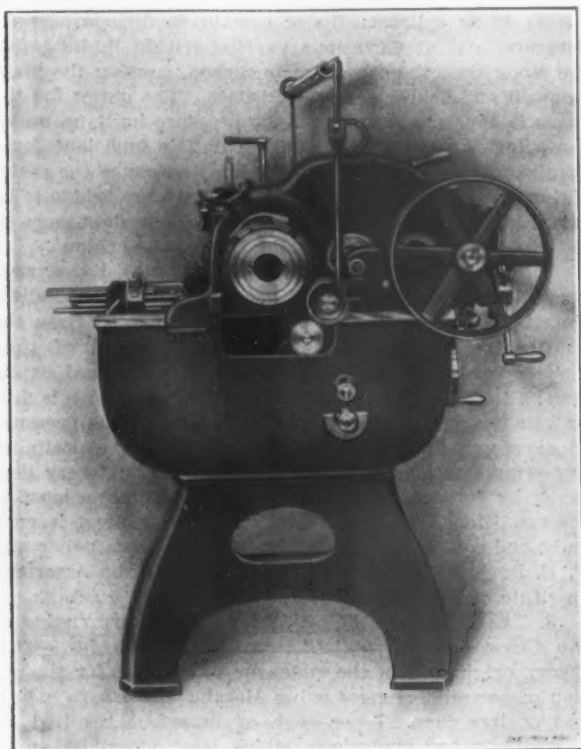
chine gives the forward, stop and back motion for the spindle, and other levers on the face of the head give speeds that are equivalent to those obtained in the ordinary machine by the regular triple back gears and cone pulley. The ten stops for the cross feed head, combined with the 12 stops for the turret and the turning and boring tools, render the machine instantly ready for work. All the shears and running surfaces are protected from the dust of cast iron, so that the machine may be used either for steel work in which oil is used or for cast iron chucking. The machine is made in two sizes with an outfit of tools for boring work and chucking. The 2 x 24 size turns bars up to 2 1/4 inches in diameter and 24 inches long and does chucking work up to 12 inches in diameter. The 3 x 36 size turns bars up to 3 inches in diameter and does chucking work up to 14 inches in diameter.

H. C. Frick, it is reported, intends to erect three large buildings in the downtown district of Pittsburgh within the next two or three years. It is probable that two of the structures will be office buildings and the other a modern hotel. It is not likely, however, that any work on these buildings will be started this year.

A Demonstration of the New Sellers Planer.

A demonstration of a new planing machine, operated by pneumatic clutches, was given on Saturday, April 30, before a party of invited guests by Wm. Sellers & Co., Incorporated, at their works, 1600 Hamilton street, Philadelphia, Pa. Following the serving of a luncheon the visitors were introduced to the machine by Wm. Sellers, Jr., chief engineer of the company, who explained from a chart the principles involved in the new pneumatic device.

It was explained that the object was to overcome the limitations of the old style planer on which the reverse was accomplished by a shifting belt, the limiting conditions being the width and speed practicable and the amount of inertia of the pulleys which it is possible to overcome. It is well known that the reversing of the rapidly revolving pulleys of a planer is as great a problem as the reversing of the table. In the machine shown there are no reversing pulleys and no reversing belts, the drive belt running continuously in one direction, so that



End View of the New Jones & Lamson Flat Turret Lathe from the Head Stock Side.

the influence of inertia is reduced to a minimum. A 50 horse-power Crocker-Wheeler motor, running at about 875 revolutions per minute, supplies the power. The reverse is accomplished by a pneumatic clutch mounted on one side of the planer near the base. The friction surfaces are of end grain maple, and the contact of the slidable member is obtained by air pressure at about 70 pounds per square inch directed alternately on either side through a valve mechanism controlled by stops on the planer bed. Through a spiral gear the clutch drives an inclined shaft, carrying another spiral gear meshing with a rack on the planer bed; so that, with the exception of the main belt and those for the feeds, no belting is used in the drive of the planer. The gear ratios are such that the bed is given a constant returning speed of 100 feet per minute, and the cutting speed may be varied from 25 to 48 feet per minute by changing gears, which, as was demonstrated, can be accomplished in a very few moments.

In the lubrication of the V's of the bed there is a novel arrangement. No rollers or wipers are used, but instead a stream of oil is forced into the V's by an oil pump near one end of the base and is distributed by grooves to the rubbing surfaces. The machine is capable of taking work 100 inches wide, 96 inches high and 20

feet long. There are four slide rests, two on the cross head and one on each of the uprights. Each slide rest has its own variable feed. The weight of the entire machine is 60 tons, the weight of the cross rail is 12,000 pounds, and the vertical slide rests each weigh 3000 pounds. The weight of the work on the machine at the time of the demonstration was approximately 17 tons, and the table and work combined weighed over 30 tons. The actual cutting speed was 25.6 feet per minute, with three tools in operation. Both of the tools on the cross rail were taking a cut 1 1-16 x 1/8 inches, while one of the tools on the side was taking a cut 9 x 1 1-16 inches. One of the heaviest operations which has been performed on the machine was the removing of 4 1/4 inches, using but one tool. This required three cuts, the feed on each being about 3-16 inch.

A question which might be raised with regard to the efficacy of a pneumatic clutch for reversing the bed of a planer is the positiveness of the point of reverse on successive strokes. It was most effectively proved that the control by this pneumatic means was equally as accurate as the old style shifting belt method, by setting the machine to stop about half way of the length of the work, while taking a finishing cut on one side. The resulting line marked by the point at which the tool stopped at each stroke was practically as straight as though it had been planed by a tool at right angles to the position that was used. The only condition which could cause the stopping of the bed at other than the predetermined point would be a failure in the air pressure, and this could cause no change unless it fell below the maximum necessary to prevent the clutch from slipping. An entire failure of the air supply could result in nothing more serious than the stopping of the machine, as was shown by opening a valve and allowing the air to escape.

Before their departure the visitors were conducted in groups about the shops and were shown, among other interesting things, a recently completed 30-ton electric crane to be installed in the new works of the International Steam Pump Company, at Harrison, N. J., and three tool grinders, one for drills and the others for large and small planer and boring mill tools. These grinders are all automatic to an extent that nothing is left to the judgment of the operators, and accurate duplication of form is insured on as many tools and as often as required.

The George A. Fuller Company.—At a meeting of the stockholders of the George A. Fuller Company, in Jersey City, on April 28, the following were elected directors: H. S. Black, Paul Starrett, R. G. Babbage, Byron M. Fellows, Walter H. Clough, James Baird, W. A. Merriman, J. E. Fuller, O. G. Selden, S. C. Sibley and Faulkner Hill. At the directors' meeting, held immediately thereafter, Paul Starrett was elected president; Walter H. Clough, vice-president; W. A. Merriman, vice-president; Byron M. Fellows, treasurer, and David H. Lanman, secretary. The Executive Committee of the company for the coming year will be made up as follows: R. G. Babbage, chairman; H. S. Black, Paul Starrett, Byron M. Fellows, Walter H. Clough, James Baird and W. A. Merriman. The George A. Fuller Company are embraced in the United States Realty & Construction Company.

Advices from Niagara Falls state that a consolidation is soon to be made of the Cataract Power Company's interests with those of the Electrical Development Company of Ontario, holding the franchise granted to Toronto parties for the production of electrical energy on the Canadians side at the Falls. The first-named company on April 30 awarded the contract for a large portion of the construction work on their new canal west of Thorold, and the contractors, Larkin, Sangster & Begy, of Niagara Falls, Ont., have already forwarded several carloads of construction machinery to the site.

Henry Maurer & Son, 420 East Twenty-third street, New York, emphatically contradict the impression which seems to have gained credence that they are in some way connected with the National Fire-Proofing Company. They state that they have no connection whatever with that company or any other company.

Furnace Top Explosions.

BY FRANK C. ROBERTS, PHILADELPHIA.

Various theories have been advanced in explanation of what are known as "furnace top explosions" or "slips" in blast furnaces burdened with a high percentage of fine ore. Each theory has its advocates, and the arguments pro and con in each case are various. Apparently, no theory of the cause seems to satisfy all the requirements, and even the character of the result—i. e., whether it is an actual explosion or not—is open to discussion.

The result of these explosions being so serious in loss of both life and property, it is somewhat surprising that so little progress has been made in devising means or methods to prevent their occurrence. It is hoped that the views herein expressed will result in a full and free discussion of the matter and lead to conclusions which will enable the furnace manager to prevent, or at least control within limits, the conditions producing these explosions.

In the following discussion, the word "explosion" will be used as representing the result, but not necessarily as meaning an explosion in the strict sense of the word. It may be well to state also that it is not the intention of the writer to discuss all theories that have been advanced in explanation of top explosions, but to treat only of those which appear to be most generally accepted.

A Peculiar Type of Explosion.

Before treating the subject of furnace top explosions, the writer desires to mention a type of explosion which, judging by the result, is the most unique within his knowledge. In this instance a furnace 70 feet in height was completely emptied of stock down to a point below the cinder notch, surprising as this result may be. Prior to the explosion the furnace had been hanging, but not to an unusual extent. Little damage was done to the furnace; some of the brick work at the top of the furnace was displaced, but the charging apparatus was not injured, while the stock was forced out of the explosion doors and into the dust catcher and gas flues. Apparently this was a furnace bottom explosion as distinguished from a furnace top explosion, but the cause seems rather difficult of determination. One explanation is based upon the supposition of a surplus of oxygen in the space below the hanging point; a condition brought about by the fuel in the lower part of the furnace being consumed until there was not sufficient fuel to combine with the oxygen of the blast. Whether this explanation is true is somewhat problematical, but certainly the result of the explosion was remarkable and merits the most careful consideration.

Theories of Explosions.

The theories which have been most prominently advanced in explanation of explosions in the upper part of the furnace are as follows:

1. Admission of air to the space above the stock.
2. The deposition of carbon.
3. The formation of an explosive mixture owing to the absence of sufficient limestone in the burden.

These three theories will be treated in the order named:

1. *The Admission of Air to the Space Above the Stock.*—The claim is made by those advocating this theory that the use of explosion doors on the top of the furnace contributes to explosions on the supposition that air is admitted through them into the space above the stock, thus exploding the gases. At the same time the necessity for a bleeder pipe on the top of the downcomer is admitted. The writer has witnessed a great many explosions, both large and small, in cases where the bleeder valves were open, and in no instance has he seen evidence of the stoppage of the outflow of gas through the bleeder valves, indicating conditions which would cause air to be drawn into the furnace. He has seen explosions occur without any diminution whatever in the outflow of the gas, and other instances where there was a momentary reduction in the flow. It seems to be a fair conclusion, however, that if the explosions occur when there is no diminution of the flow of the gas through the bleeder valves the

cause is not the admission of air into the furnace top. Again, one of the serious results due to these explosions is the large discharge of ore and stock, a condition that indicates that the force discharging the stock must originate below the surface of the materials in the furnace; this does not appear possible if we assume that the gas above the stock is exploded by the admission of air, and it does not seem reasonable to conclude that the admission of air above the stock explodes gas which is below the level of the top of the stock. The old fashioned explosions which occur while the blast is off the furnace, or when it is first put on the furnace, are undoubtedly due to the admission of air into the gas pipes and the failure to lower the bell. This type of explosion is typical of an explosion of gas in the furnace top due to the presence of air and rarely results in the throwing out of any stock; furthermore, it is accompanied by a loud detonation and is rapid in action, while the form of explosion under discussion is not detonating, is slow in action and decreases gradually in power. It may be concluded, therefore, that a gas explosion due to the admission of air into the space above the stock is very different in its results from the type of explosion under consideration.

2. *The Deposition of Carbon.*—Briefly stated, this theory is as follows: Under certain conditions of temperature, and at elevations varying within limits below the stock line, the ore deposits carbon, causing the mass to swell and bridge over the furnace. The outlet for the gases is thus restricted, and the pressure built up under the bridge by the blowing engine until a sufficient force results to break through the bridge and cause the material composing the bridge and that above the bridge to be blown upward with considerable force, dependent more or less upon the weight of the stock above the bridge.

In support of this theory, it may be stated that as a general rule an explosion is preceded by certain indications, such as sparks and black gas discharged from the bleeder, and usually an appreciable interval of time elapses between these indications and the actual explosion; all of which seems to indicate that the bridge is first broken through in channels by the effort of the pressure to overcome the resistance, thus showing the preliminary symptoms mentioned. This theory is held very generally by furnace managers, and certainly meets most of the conditions. Carbon deposition and its effect is very fully and completely treated in O. O. Laudig's paper and F. E. Bachman's discussion thereof before the American Institute of Mining Engineers in September, 1896.

3. *The Formation of an Explosive Mixture Owing to the Absence of Sufficient Limestone in the Burden.*—This theory originated in the endeavor to account for the action of certain furnaces using Mesaba ore, where a burden of less than 27 per cent. of limestone resulted repeatedly in top explosions, which were absent when 27 per cent. or more of limestone was carried. In these cases from one to three charges of stock were blown out in each explosion, indicating that the explosions occurred well below the top of the stock. The first experience of this character of which the writer has knowledge occurred at the furnaces of the Lackawanna Iron & Steel Company, under the management of A. H. Lee.

Reasoning that the explosive mixture is formed in the zone in which the carbon is deposited, it is assumed that in some mysterious way the deposited carbon combines rapidly with the oxygen of the ore, forming a large volume of gas and causing an explosion. The theory which is advanced to account for the absence of explosions when carrying the larger percentage, and their frequent occurrence when the burden contains the lesser percentage of limestone, is that the larger proportion of stone gives off sufficient CO₂ to form a nonexplosive atmosphere. This explanation was first brought to the writer's attention by Frank F. Amsden. The main objection to this theory seems to be that it is predicated upon the result being an explosion in the true sense of the word, while the evidence seems to be convincing that no actual explosion takes place, but that the condition is one of excessive pressure for the reason that, as before stated, the explosions, as a rule, are slow in action, extending over an appreciable length of time, and gradually decreasing in power from the beginning to the end.

It appears to the writer that the absence of explosions

when the larger percentage of limestone is carried is best explained by a theory based upon the supposition that the CO_2 of the limestone attacks the deposited carbon; the result of this reaction being CO , and the prevention of the accumulation of deposited carbon, which would otherwise result in the forming of a layer of stock through which it would be difficult for the gas to penetrate, as set forth under No. 2. In support of this proposition it may be said that while it is the general opinion that a large batter is advisable in furnaces working Mesaba ores, it does not appear to be a necessary condition when a high percentage of limestone is carried, indicating that the usual increase in bulk of the ore due to carbon deposition does not take place. This question of inwall batter will be referred to later.

Explosions Caused by Carbon Deposition.

It would thus appear that the explanation of top explosions, so far as present knowledge goes, is dependent upon the acceptance of the controlling principle of carbon deposition as set forth in No. 2. In other words, that explosions are caused primarily by carbon deposition, and that the carrying of a sufficient quantity of limestone apparently prevents top explosions by checking cumulative carbon deposition.

Of course, there is no particular magic in the 27 per cent. of limestone mentioned; no one percentage can be adopted as applicable to all furnace mixtures. Apparently, however, this was the magic percentage in the cases noted. Different ores deposit carbon at different rates and in varying quantities, and the required percentage of limestone necessarily depends upon the character of the ore mixture as well as upon the analysis of the limestone. Evidently each mixture must be a rule unto itself.

Apparently, the physical condition of the limestone is of great importance, as evidenced by the following instance: At a certain furnace, having about seven-eighths Mesaba ore in its burden, no explosion has ever occurred when 30 per cent. or over of lump limestone is carried. A short time ago it was hoped to lower the fuel consumption at this furnace by crushing the limestone to such a size that all stone would pass through a 4-inch ring, a condition which involved from 15 to 20 per cent. of the stone passing through a 1-inch ring. This crushed limestone was placed on the furnace instead of the lump stone; immediately top explosions began, and continued every few hours over a period of two weeks. At the expiration of this time resort was again had to lump stone; the explosions immediately ceased, and none have occurred during the two months which have since expired. The result indicates that the crushed limestone parts with its CO_2 too high in the furnace and before reaching the zone of carbon deposition, while the lump stone retains a large part of its CO_2 until it reaches the point where it acts upon the carbon. It is also fair to assume that the lump stone keeps the stock more open to the gases and contributes to the freer action of CO_2 and the readier access of the latter to the carbon. The relative effect of lump and crushed limestone is exceedingly interesting, and while it seems reasonable to admit the truth of the foregoing statements, yet they are probably not the whole truth, and further investigation would doubtless show other influences which the physical character of the limestone exerts upon the tendency to create conditions leading to explosions.

Experiments to Control or Prevent Explosions.

Having outlined certain theories as to the causes of top explosions, it may be well to mention some of the experiments that have been made in the effort to control or prevent their occurrence.

Much has been claimed for the "tight top furnace"—i. e., one which is air tight and without explosion doors, the whole being built of sufficient strength to withstand the pressure of the explosion. This device is predicated upon the explosion being due to the admission of air to the furnace top, and has been discussed under No. 1.

It is generally admitted that a high batter to the inwall is desirable, but cases are known of excellent furnace work and an entire absence of explosions in furnaces having a very low batter to the inwall. For in-

stance, in one of the furnaces already referred to the inwall batter is only 0.35 inch per foot. This furnace has been in operation for two years under a burden of seven-eighths Mesaba, with 30 per cent. or over of limestone, and has never had an explosion except when operating with the crushed limestone before mentioned. Practically, it would seem wise to provide for the increase in volume of stock due to carbon deposition by a high batter, but apparently this is unnecessary where the proper quantity of lump limestone is carried, the quantity of limestone being dependent upon the character of both the limestone and the ore mixture.

Undoubtedly slow running tends to overcome the difficulty of top explosions, a fact which is probably due to the relatively less rate of carbon deposition in proportion to volume of ore and gas.

It is believed by many furnace managers that a low bosh contributes to the success of a furnace working Mesaba ores. It is doubtful, however, whether the design of the bosh has much effect upon the tendency to top explosions.

Various methods of charging have been used with greater or less benefit in the endeavor to overcome the difficulty. So far as the writer knows, however, no general rule or conclusion has been arrived at in this respect. The success of one method or another seems to depend on local conditions. The Killeen top has proved itself of great advantage in a number of instances, a result which, in the writer's opinion, is due to its effect upon the uniformity of stock distribution. The distribution made within the furnace by the usual bell and hopper varies with the height of the stock in the furnace, whereas the distribution made by Killeen top is practically the same whether the stock is high or low in the furnace; all of which contributes to uniformity, a most important requirement in furnace operations.

Various proportions between the diameters of the bell and stock line have been employed, but without developing any fixed theory. This space between the bell and the furnace walls has always been a matter of interest to furnace managers. It is frequently overlooked, however, that the distribution in the furnace depends not only upon the relative dimensions of the bell and stock line, but also upon the quantity of material to be charged; the physical character of the materials has generally been taken into account, but too little consideration, in the writer's opinion, has been given to the size of the charge. Instances are known where serious difficulties in furnace operations were entirely overcome by doubling the charge.

It is unfortunate that so little definite knowledge is available in connection with this question of top explosions. The matter is of such importance that some one should be willing to devote the time and attention necessary to make the required observations and investigations in a thoroughly scientific manner. Until such an investigation is completed, we can hope for little but general conclusions based upon purely theoretical considerations.

It is the firm conviction of the writer, however, that means or methods will be developed whereby the desired end will be reached, and that the expedients adopted will depend primarily upon the control of carbon deposition.

In the light of our present knowledge, it would appear that the following conclusions are warranted:

1. That top explosions are not due to the admission of air to the space above the stock in the furnace, and that the occurrence of explosions cannot be ascribed to the presence of explosion doors.
2. That the theory which best explains top explosions is the "carbon deposition" theory.
3. That apparently the carrying of a proper percentage of limestone in the burden furnishes a condition which prevents cumulative carbon deposition, and hence prevents top explosions. Further, that the limestone should be lump stone, and that the required percentage will vary with the character of the stone and ore.

The armored cruiser "California" was launched at the shipyards of the Union Iron Works, San Francisco, on April 28.

The Edison Medal.

The conditions governing the award of the Edison medal are explained in a letter from the American Institute of Electrical Engineers, to which has been intrusted the responsibility of awarding it. This is being sent to all of the educational institutions of the United States and Canada, whose students are eligible to compete for the medal, requesting them to make application in the regular manner for the consideration of their candidates. The fund for the medal was created by an organization known as the Edison Medal Association, which was founded by the friends and admirers of the great inventor, its purpose being to celebrate the achievements of the last quarter of a century with which the name of Thomas Alva Edison is identified and furnish an incentive to the youth of America to emulate his example. The gift was formally made and the responsibility of offering assumed by the Institute at its annual dinner

5. The thesis or record must not exceed 6000 words, not inclusive of words employed in explanation of accompanying drawings.

6. No competitor shall be of greater age than 25 years at the day of his graduation in such course of study.

The Edison Medal Committee is being selected from among the members of the Institute who are not now connected with educational institutions, but who have the necessary early educational and subsequent experience to enable them to critically analyze and justly determine the merits of the theses offered in the various fields of research.

The Woodward & Powell Variable Speed Planer Countershaft.

A part of the exhibit of the Woodward & Powell Planer Company, Worcester Mass., at the St. Louis Exposition will be a planer driven through a variable speed,

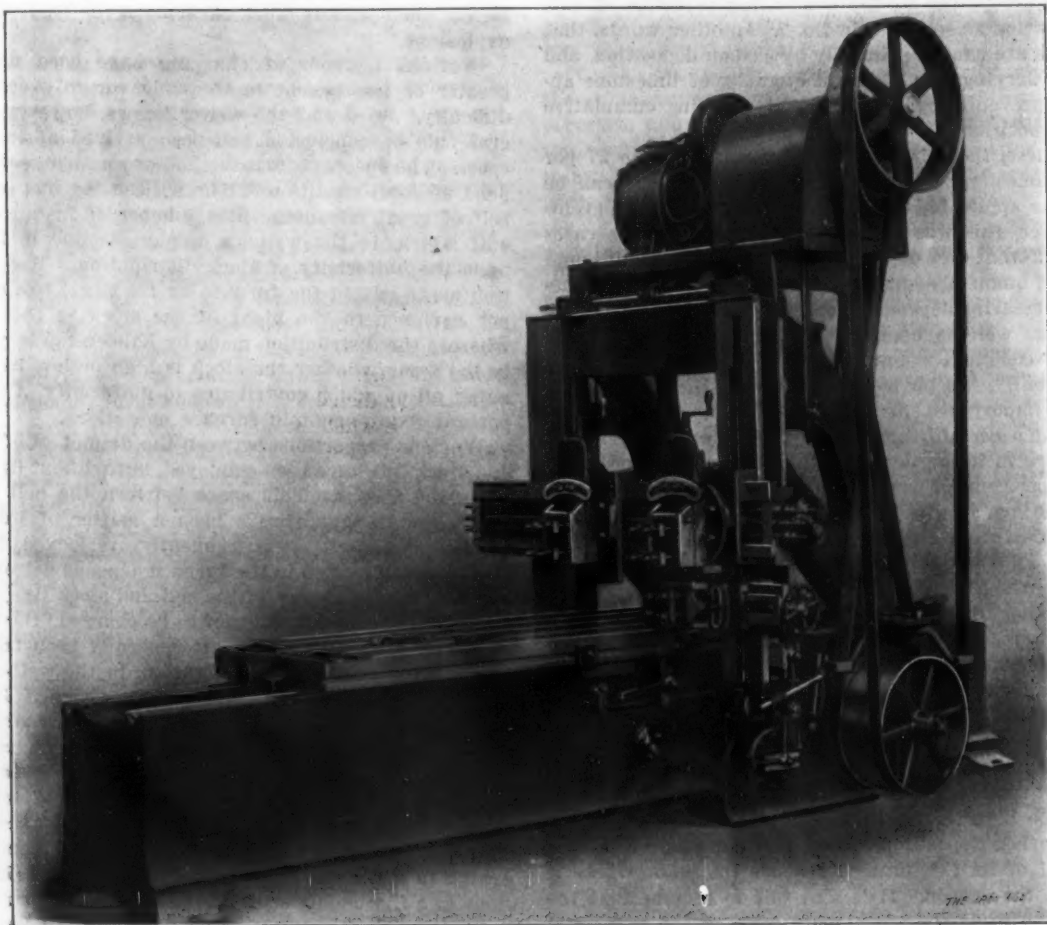


Fig. 1.—A Woodward & Powell Planer with Motor Driven Variable Speed Countershaft.

given at the Waldorf-Astoria Hotel in New York on February 11 last held in commemoration of Mr. Edison's fifty-seventh birthday.

The educational institutions addressed are requested to reply on or before June 1, 1904. The conditions as set forth in the deed of gift are as follows:

1. The medal shall be awarded to such qualified students as shall have submitted to the Institute, in accordance with the provisions of this deed, and of the regulations which may be prescribed by the Edison Medal Committee, the best thesis or record of research of the theoretical or applied electricity or magnetism.

2. Each competitor for the medal in order to be qualified must have graduated and received a degree during the year for which the medal shall be awarded, in some course of study at some institution of learning in the United States or Canada, which course of study shall include the branch of electrical engineering. The United States Naval Academy and Military Academy are included within the institutions from which competitors may be qualified.

3. Not more than two students may compete in any one year from any one institution of learning; nor may any student compete unless duly presented for competition through the faculty of the particular institution at which he is a student.

4. The course of study must be one normally representing not less than two years of continuous residence and work.

motor driven countershaft, a view of which is shown in Fig. 1. As will be seen, the countershaft and motor are mounted on top of the housings, with all gears and working parts inclosed in protecting casings. The mechanism provides three cutting speeds for the table, of 16, 24 and 32 feet a minute, these being based on a constant motor speed of 1140 revolutions per minute, but other speeds in the same ratio may be had by altering the gear ratio between the motor and the main shaft.

The construction of the device and the nature of its working may be best understood by referring to Fig. 2. A secondary shaft, which may be termed the cutting shaft, is driven from the main shaft by means of intermediate gears mounted on studs between two rocking plates, the whole constituting what is called the rocking box. The cutting shaft, at the back of the rocking box, carries a cone of three gears and the main shaft a long gear. The gears on the rocking box correspond in size, in inverse ratio, to those on the cone, and may be separately introduced between the cone and the long gear. This is accomplished by a lever on the side of the planer, the fulcrum being so arranged that it will rotate the box to mesh

either one of the three idler gears with its corresponding gear of the cone and the long pinion on the main shaft.

In each position the rocking box is fastened by a locking device consisting of a segment on the right side of the rocking box having six ratchet like incisions, three active in one direction and three in the reverse direction—that is, three are cut right hand and three left hand. Two

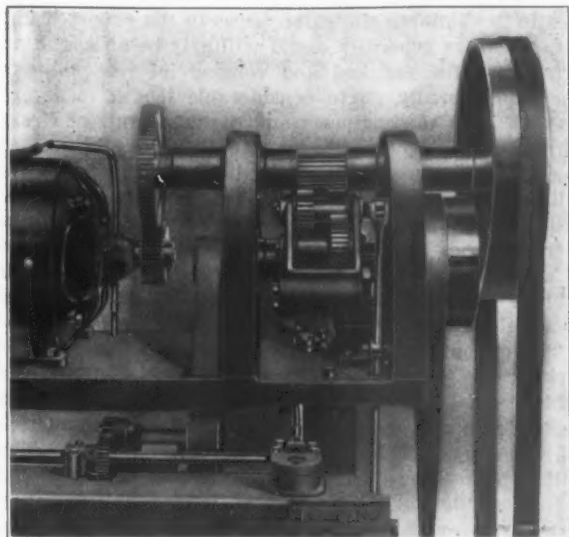


Fig. 2.—The Countershaft with Casing Removed.

pawls are provided, which work in opposite directions, and are operated by a plug or wedge, actuated by a system of levers from a handle at the back of the planer, shown in Fig. 3. A movement of the plug throws the two pawls into the teeth of the segment, and acting in opposite directions they hold the rocker box firmly in position. The arrangement is such that the pawls cannot be thrown in unless the gears are firmly in mesh. When the plug is withdrawn the pawls fall out by their own weight, permitting the rocking box to be shifted to give another speed. If a greater speed range is required, it is feasible

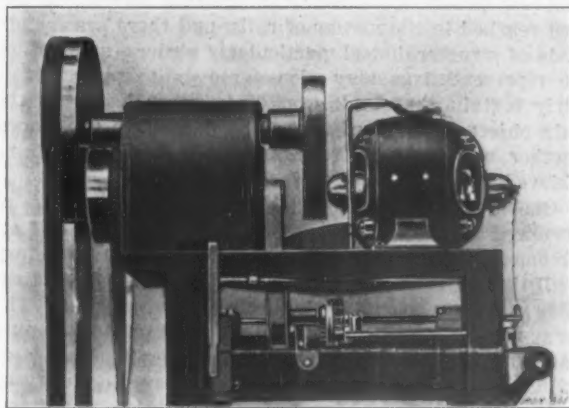


Fig. 3.—Rear View of the Motor and Countershaft.

to equip the rocking box with four intermediate gears to give four changes of speed, in which case eight teeth will be necessary in the segment of the locking device.

The raising and lowering of the planer head is accomplished by a belt from the cutting shaft, which may be seen in the front and rear views, Figs. 2 and 3. The drive for returning the table at the end of each cutting stroke is afforded by a constant speed pulley on the main shaft of the mechanism, which gives a table speed of about 60 feet a minute, but a faster one may be substituted if desired.

Tube Welding Record.—Two welders in the butt mill of the American department of the National Tube Company, Middletown, Pa., last week established a world's record for making 2-inch butt weld pipe by turning out

2855 pipe, welded in 12 hours. The highest previous record was 2700. This mill has always had a reputation for its capacity, but never before tried for a record.

March Iron and Steel Imports and Exports.

The great change which has taken place in the character of our foreign iron and steel trade within the past year is manifesting itself more strongly from month to month. The March figures just issued by the Bureau of Statistics of the Department of Commerce and Labor show a heavy increase in the exports and a great falling off in the imports, as compared with the corresponding month of last year. The exports for March and the three months ending with that month, as compared with the corresponding periods of last year, on those articles for which quantities are given, were as follows:

Exports of Iron and Steel.

Commodities.	March.		Three months.	
	1904.	1903.	1904.	1903.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	3,954	1,532	14,125	3,839
Scrap	1,937	659	5,282	1,042
Bar iron.....	3,058	3,299	6,745	3,944
Wire rods.....	3,035	2,748	3,855	4,624
Steel bars.....	1,093	914	2,832	6,706
Billets, ingots, blooms.....	36,908	157	80,297	511
Hoop, band, scroll....	516	285	1,105	525
Iron rails.....	584	7	1,201	19
Steel rails.....	17,873	415	31,298	1,392
Iron sheets and plates	173	118	446	359
Steel sheets and plates	2,724	1,438	4,955	2,716
Tin plates and terne plates	502	20	701	149
Structural iron and steel	1,843	1,939	7,133	7,752
Wire	11,327	10,104	26,953	24,164
Cut nails.....	639	555	2,164	1,847
Wire nails.....	2,962	2,237	7,065	5,722
All other, including tacks	204	147	613	458
Totals.....	89,332	26,574	196,770	65,769

It is of interest to note in this connection that exports of similar articles in February aggregated 57,558 tons and in January 49,880 tons. The export movement thus shows a rapid increase, as the figures for March are but little short of being double those of January. The total exports for the three months ending with March were practically three times the quantity exported during the corresponding period of 1903.

The figures for imports are equally impressive as showing the relaxation of the demand for foreign iron and steel, which was such a notable feature of the trade in the early months of last year. The imports in March of those articles for which quantities are given were but one-fourth as much as during March, 1903, while for the three months ending with March the quantity imported this year was only one-fifth as great as that for the corresponding period of last year. The figures for the month and three months, compared with 1903, are as follows:

Imports of Iron and Steel

Commodities.	March.		Three months.	
	1904.	1903.	1904.	1903.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	12,400	59,628	27,053	215,494
Scrap	2,498	7,327	3,641	24,380
Bar iron.....	1,222	3,995	4,709	13,918
Rails	1,135	17,880	10,819	43,089
Hoop, band and scroll.	18	219	734	385
Billets, slabs, bars, &c., steel in forms n. e. s.	1,146	31,465	4,520	90,325
Sheets and plates....	611	319	2,392	2,299
Tin plates and terne plates	6,069	3,478	15,315	12,802
Wire rods.....	785	1,778	3,804	4,890
Wire and articles made from	513	450	1,287	939
Structural iron and steel.....	1,770	....	3,823	....
Chains	23	29	100	108
Anvils	5	14	28	30
Totals.....	28,795	126,582	78,225	408,659

* Included in "All other" prior to July 1, 1903.

The value of all iron and steel exports, excluding ore, in March was \$10,633,720, against \$7,983,547 in the corresponding month of last year. The value of all iron and steel imports, excluding ore, in March was \$1,894,306, against \$4,129,845 in March, 1903.

The International Steel Conference.

LONDON, April 22, 1904.—The secrets of the conference now being held in London between representatives of the United States Steel Corporation, the German Syndicate, the Austrian Trust, together with the Belgian and French representatives, with the cognizance and assent of some prominent British iron and steel makers and merchants, have been uncommonly well kept. Nothing leaked out publicly until Thursday evening, April 21. Undoubtedly it is a commercial event of the first importance, not only to those interested in iron and steel, but to business men of all classes, for if anything practical should come out of the conference it is easy to foresee similar conventions in other trades. Doubtless the heaviest responsibility rests upon Colonel Millard Hunsiker, representing the United States Steel Corporation, and Herr Thyssen, of Mulheim, representing the German Syndicate. Herr Shuster represents the Austrians. Piquancy is lent to the whole affair by the presence in Europe of Andrew Carnegie and J. Pierpont Morgan, although the proximity of these two gentlemen may be fortuitous, and not intentional.

As has been said, practically nothing has leaked out, and we are left largely to surmise. It is certain that the preliminary proceedings have been beset with obstacles and difficulties of no mean order. None the less, there are many important forces operating toward a settlement either as to delimitation of frontier or minimum prices. It is now public property that the German Syndicate is sick of dumping its products at a loss. It is equally clear that if British iron and steel masters could for the future be certain that the dumping process would not be renewed they would willingly make valuable concessions. But on this point there are difficulties.

Difficulties to Be Encountered.

Perhaps one or two observations from the British point of view may help readers to an understanding of the British situation. Obviously, the first difficulty to be encountered is that no British makers can go into this conference with a mandate, for the simple reason that there is no organization here sufficiently strong to warrant the granting of any plenary credentials. Nevertheless, the operations of the joint stock acts of Great Britain have unconsciously evolved a type of commercial statesman, particularly in the iron and steel trades, and it is not an exaggeration to say that a dozen of these gentlemen, if they agreed among themselves, would be strong enough largely to control the British industry. I have reason to know, however, that at least one of the very largest of the British ironmasters looks askance at the conference and quite frankly foretells failure.

But the ironmaster is not all powerful. The engineering industries are unusually strong and they are financially quite equal to securing their raw and semi-raw material at low prices, no matter what conclusions may be reached by an international syndicate. If prices were to be held up against them it would not take long for them to purchase on a co-operative basis not merely their ore, but the works necessary to produce their structural steel and similar commodities. Further, the great self contained enterprises, such as Armstrong-Whitworth, Cammell-Laird, and Vickers, Sons & Maxim, to mention only three, possess their own raw material or can control companies who make bars and billets, sheets, armor plates, and so forth. Concerns such as these are very largely independent of any international convention. If we suppose that a minimum price is reached, that dumping in Great Britain ceases, that a mutual limitation of markets is agreed upon, one of two things must happen: Either great engineering concerns who depend upon the cheapness of their supplies to compete with their self contained competitors must at all hazards obtain their structural steel, &c., upon terms at least equal with the cheapest available, or they must possess themselves of their own rolling mills, &c., to reach an equality with the self contained units.

In Great Britain the merchant is in a very strong position. If, therefore, we bear in mind two facts, that the British ironmasters cannot go into the conference with more than limited authority, and that in any event the

British merchant, both by investment and contract, has a very firm grip upon his own sources of supply, it becomes evident that whatever arrangements may be reached between the American, German, Austrian and Belgian syndicates, the British representatives can only co-operate in a very limited degree. Great Britain is, therefore, a very serious stumbling block. It happens that British makers have not been dumping to anything like the extent of the Germans, for the prosaic reason that it does not pay. If, therefore, the object of the American and German syndicates is to eliminate slaughter prices in the export trade, British makers generally would willingly be an assenting party. But for political and commercial reasons they would undoubtedly go to considerable length to secure this end. But the engineers and the merchants of Great Britain are jointly and severally quite strong enough to compel the ironmasters to maintain reasonably low competitive prices. It is, of course, true also that both the engineers and the merchants would like to fall back upon other countries for their raw material if home prices do not suit them. To the extent that the conference would preclude this, the British makers are, of course, correspondingly strengthened.

The difficulties involved in any mutual limitation of territory must also be recognized as a vital factor in the problem which the conference seeks to solve. Here again the trade can more easily be swung round by America and Germany than by the British representatives. The British connections in all countries are so deeply rooted and so complex in character that it is doubtful if any working arrangement could be reached. Against this, however, has to be set the plain fact that most British exports to most countries are of a more highly finished material than structural steel, sheets and rails. None the less, railway contractors, bridge builders and so forth are not likely tamely to submit to any arbitrary decisions determined upon by the iron and steel syndicates for their own special convenience. And yet again, in arriving at a minimum export price it will be recognized that quality must play a considerable part in the issues. Even steel rails are not so standalized in point of quality as to warrant any fixed minimum price.

British Steel Makers Would Be Benefited.

Taking into consideration all the elements involved, the one logical conclusion is that if an agreement be arrived at it will only be in regard to a small number of semi-raw products. I hear that general agreement has been reached in the matter of rails, and there are certain kinds of structural steel, particularly girders, upon which the representatives may also agree as to price. It is fairly certain that limitation of territory has been the main object of the conference, but it may be questioned whether any practical results in this direction will be achieved.

One of the largest Sheffield steel manufacturers, interviewed last night, did not hesitate to say that if an agreement could be arrived at, an agreement satisfactory to all the nations represented, it would be of the greatest value to the whole steel industry of the world. "The Germans," he added, "have found in regard to dumping that it has not been the grand success they expected it to be. Certainly they have disposed of a large quantity of steel in various stages of manufacture in this country, but they have had to sell the greater part of it at a loss, and they find themselves unable to continue this policy. They will undoubtedly be glad to come to some agreement. On the other hand, of course, British manufacturers have suffered seriously as a result of dumping, and if some arrangement could be arrived at by which prices all over the world could be regulated and dumping restricted the steel manufacturers of Great Britain would benefit by such an agreement."

As against the Sheffield manufacturer's opinion comes an announcement from an authoritative source that some of the largest steel makers in the Midlands and South Wales do not appear to be concerned. Nor does the scheme seem to be regarded as at all probable. Apart from the difficulty of bringing the British trade into line, it is thought to be extremely unlikely that such keen competitors as America and Germany would consent to an arrangement which would tie their hands in a market

which, when it suits their policy, is a valuable outlet for their products. We may expect during the next few weeks to hear a great deal about this conference, and it will not be very long before the forces favorably and unfavorably affected will line up in battle array.

Finally, the leading firm in the North of England iron and steel trades do not appear to have been consulted with regard to the conference, and the feeling expressed in Middlesbrough is that no combination could be made sufficiently wide reaching to control international prices. As to dumping, if the Germans find it so inconvenient they can stop it independently of British steel workers. "They need not dump unless they like," says Hugh Bell, a leading ironmaster.

S. G. H.

A 1500-Kilowatt National Alternator at the Exposition.

In the central power station for the Louisiana Purchase Exposition at St. Louis the National Electric Company, Milwaukee, Wis., have installed a 1500-kw. alternator, which will be direct connected to a 2250 horsepower Hamilton-Corliss vertical cross compound engine

The net weight of the alternator is 135,000 pounds, and the following is the guarantee:

Efficiency $1\frac{1}{4}$ load.....	95.5
Efficiency full load.....	95.5
Efficiency $\frac{1}{2}$ load.....	94.75
Regulation 5.5 per cent. on power factor.....	1
Regulation 22 per cent. on power factor.....	0

The temperature will not exceed 30 degrees on the armature magnets on a continuous run at full load nor 40 degrees on a continuous run at 25 per cent. overload.

The New Merriman Automatic Bolt Cutter.

Many interesting features are embodied in the new Merriman automatic bolt cutter illustrated herewith. These are to be found particularly in the head or chuck, which though having the advantages of an open die is, in all respects, the equivalent of a solid die by reason of the square bearing which the dies have on the inclosing ring. The head consists of four parts, designated as die box, ring, cap and flange, and shown in Fig. 1. The die box is made of steel, and contains four die slots, into which the dies are accurately fitted and firmly held, but allowed a

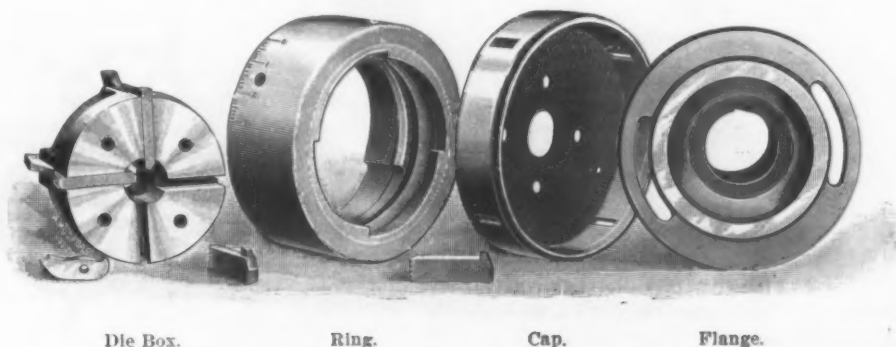


Fig. 1.—The Parts of the Head of the New Merriman Automatic Bolt Cutter.

running at 83 revolutions per minute. Current will be delivered at 6600 volts, 25 cycles, and the power generated will be used for various exposition purposes.

The machine is of the revolving field type, wherein the armature being stationary is easily accessible and less difficult to properly insulate. The revolving field is 16 feet in diameter, and weighs approximately 50,000 pounds, giving additional fly wheel effect to the engine. It is made of cast steel in halves, these being bolted and secured together by shrunk links. The rim of the wheel is of channel cross section, to which the cast steel pole pieces are bolted. On the field coils are 65 turns of $1\frac{1}{2}$ x 8 inch copper strap wound on edge and thoroughly insulated. Laminated pole shoes are secured to the ends of the pole pieces and serve to retain the field coils. These shoes cover a large polar arc, distributing the magnetic flux evenly. Fuller board is used to insulate the field coils from the pole pieces, and heavy fiber to insulate the pole shoes from the spider ring.

The frame is a circular cast iron housing, into which are incorporated laminated punchings with inwardly projecting teeth for the reception of the armature windings. The frame is heavy and stiff, requiring no external support, and is divided horizontally, the halves being bolted and keyed together. The bolts and keys are contained within the cross section, obviating the use of outside lugs. Innumerable open spaces are provided in the frame to allow a free passage of air from the ventilating ducts in the core. The armature core is built up of laminated soft steel punchings, annealed and japanned before assembling, and ventilated space blocks are inserted at suitable intervals, providing openings extending around the circumference, to assist in the dissipation of heat from the windings. There are six slots per pole, $2\frac{1}{2}$ inches deep by $1\frac{1}{2}$ inches wide, and each containing 14 conductors of 0.37 x 0.28 inch compressed copper strand. The internal diameter of the armature is 16 feet $\frac{3}{4}$ inch and the width of the core 16 inches. Cast iron collector rings and carbon brushes are used.

radial movement by which they are released from the bolt when the thread has been cut. The ring, made of hardened steel, surrounds the die box and receives the thrust or bearing of the dies when in operation. The cap is secured to the die box by four screws that pass through four holes in its face. (This part is now made as a flat plate



Fig. 2.—A Single Die for Cutting $1\frac{1}{4}$ -Inch Thread, Full Size.

without the flange, as shown in the illustration. See Figs. 2, 3 and 4.) The flange slides longitudinally upon the spindle or shaft in the rear of the ring, to which it is attached by two flanged screws that pass through two long slots in the periphery of the flange into holes (not shown in Fig. 1. See Figs. 3 and 4) in the rear of the ring.

On the die box in the rear of the die slots are four small levers or dogs that lift the dies from the bolt when the thread has been cut. As the flange and ring are fastened together by the slot screws, when these parts are

drawn back by means of the movement of the lever to the left, the rear ends of the dogs are depressed, and the front ends, engaging under the projections or nibs of the dies, lift them and release the bolt. When the ring is brought forward by the movement of the lever to the right it strikes the incline on the dies, forcing them down in their slots, when they are again ready for cutting a thread. On the inside of the ring are three series of hardened steel cams or eccentrics, on the outer or right hand one of which the dies have their thrust or bearing, when the thread is being cut. By loosening the two slot screws the ring may be rotated upon the die box, causing the eccentrics to operate upon the dies, adjusting them to the desired degree. A graduated scale on the ring serves to indicate the amount of adjustment. Thus the dies may be delicately adjusted to give a tight or loose fit of the bolt in the nut.

Fig. 2 represents full size a single No. 2 die, for a bolt $1\frac{1}{2}$ inches in diameter. The dies are made of flat

previously adjusted for the proper length of thread, is pushed against the dog 4 by the advance of the bolt vise carriage against stop collar 7, when the dog 4 is displaced from its support of the rider 2, which drops into and engages the cam 1. This revolving draws back the ring in the manner previously described, and the dies are opened and released from the bolt. The bolt vise carriage can then be drawn back, when the dog 4 will be drawn by a spring into its place supporting the rider 2, and the operation can be repeated at will. In drawing back the bolt vise carriage, the stop collar 8 having been properly adjusted, the dog 4 is thrown against the rider 2, which closes the ring of the head upon the dies, or they may be closed by the hand lever, and they are then ready for again cutting the thread. A strong spring at the stop collar 8 prevents any harmful shock by concussion when drawing back the vise carriage.

The front view, Fig. 3, shows the rider dropped into the cam ready to throw open the dies by the further revo-

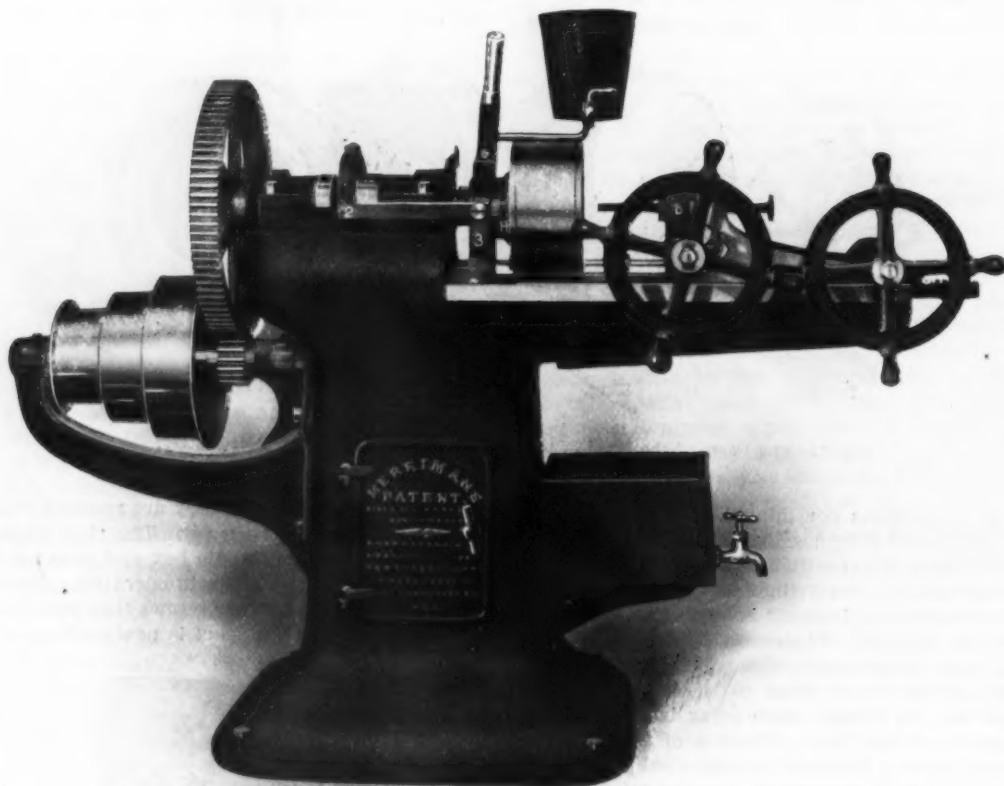


Fig. 3.—Front View of No. 2 Bolt Cutter.

pieces of steel, milled or planed so as to leave the nib, by which the dog lifts the dies from the work. It will be observed that the dies have square heads where they bear on the inside of the hardened steel ring. As before stated, this makes them rigid and as unyielding as a solid die, insuring a uniform product, an important essential of a good bolt cutter. No adjusting screws are used or needed. The dies can be recut several times for their original size of bolt, and when that capability has been exceeded they can be recut for use on larger sizes of bolts, that do not require such long dies. In the end, the balance of stock rejected is an insignificant item.

The automatic stop action, Figs. 3 and 4, for opening the dies when the thread has been cut the desired length, as applied to the No. 2, or $1\frac{1}{2}$ -inch machine, makes use of a cam, 1, Figs. 3 and 4, fixed on the spindle; a rider, 2, connected with a yoke, 3, which operates the ring of the head (see Fig. 1); a dog, 4, which supports the rider when it is not engaged with the cam, and a connecting rod, 5, which carries the stop collars 6, 7 and 8.

The method of operation of the automatic stop action is as follows: When the thread on the bolt has been cut to the desired length the stop collar 6, which has been pre-

viously adjusted for the proper length of thread, is pushed against the dog 4 by the advance of the bolt vise carriage against stop collar 7, when the dog 4 is displaced from its support of the rider 2, which drops into and engages the cam 1. This revolving draws back the ring in the manner previously described, and the dies are opened and released from the bolt. The bolt vise carriage can then be drawn back, when the dog 4 will be drawn by a spring into its place supporting the rider 2, and the operation can be repeated at will. In drawing back the bolt vise carriage, the stop collar 8 having been properly adjusted, the dog 4 is thrown against the rider 2, which closes the ring of the head upon the dies, or they may be closed by the hand lever, and they are then ready for again cutting the thread. A strong spring at the stop collar 8 prevents any harmful shock by concussion when drawing back the vise carriage.

The builders of the machine are H. B. Brown & Co., East Hampton, Conn.

An oil propelled motor railroad coach is being built for the Great Northern Railway of Great Britain. The car will be of the standard gauge, and will have a capacity for 30 passengers. The motor will be of the Roots oil type, developing 40 horse-power, and giving a maximum speed of 35 miles per hour. The engine is to be available for various kinds of liquid fuel, such as ordinary petroleum oil, gasoline, paraffin or kerosene. In the first car attention will be devoted to reliability and efficiency of the motor rather than to speed.

The Clairton Steel Company Sold.

The following statement has been given out by E. H. Gary, chairman of the United States Steel Corporation:

"The United States Steel Corporation have contracted with the Crucible Steel Company of America for the purchase by the former of the properties controlled by the latter, known as the Clairton Steel Company properties. They consist of about 150 acres of land located on the Monongahela River, between McKeesport and Donora, 17 miles from Pittsburgh, on which there have been completed and are now in operation three blast furnaces, 12 open hearth furnaces, one 40-inch blooming mill and one 28-inch billet mill, together with necessary shops, power plants, &c.; also 2907 acres of good coking coal lands in Fayette County, Pa; Champion Iron Company properties on the Marquette range, including 20,000 acres in fee and a large tonnage of ore already developed; one-

"A contract has also been made with the Crucible Steel Company whereby the latter will receive and take from subsidiary corporations of the United States Steel Corporation for a term of ten years about 120,000 tons of steel per annum and about 80,000 tons of pig iron per annum on a sliding scale of prices.

"Negotiations for the purchase and sale of these properties have been pending to a greater or less extent during the past year, but until the present time an agreement could not be reached. The property has been contracted for after the most critical and painstaking examination by the experts of the United States Steel Corporation and subsidiary companies, and has been secured at a price materially less than its cost to the Crucible Steel Company, and as to the manufacturing properties at a price much less than the same could be duplicated for at the present time."

A statement given out by officials of the Crucible Steel

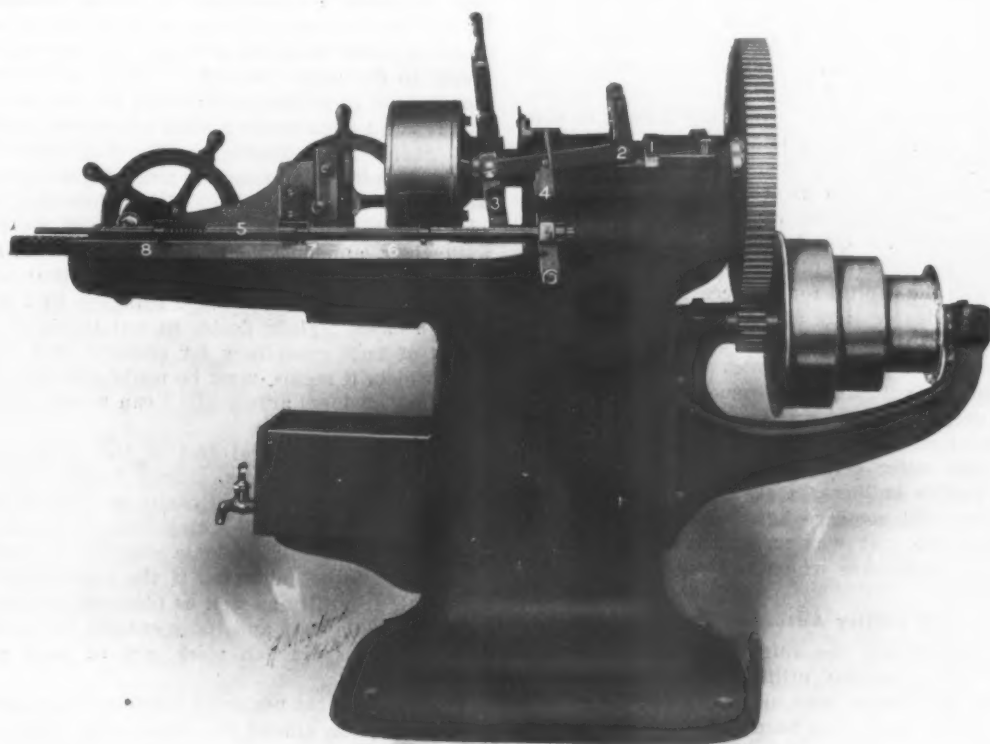


Fig. 4.—Rear View of No. 2 Bolt Cutter.

half interest in Clairton mine; the Little & Prindle iron mine; 51 per cent. of the stock of the St. Clair Limestone Company; about 14 acres of land adjoining the steel plant on which are located 140 dwelling houses; also the total capital stock of the St. Clair Terminal Railroad Company, who have built and own a new double track steel bridge across the Monongahela River, and whose railroad connects the manufacturing plant with trunk lines of railroads on both sides of the river. Also included in the purchase are cash, notes, bills receivable and inventory, of the total guaranteed cash value of \$2,619,000. The manufacturing plant is new, modern, just finished and first class in every respect. The plant has a capacity of about 475,000 tons of pig iron per annum and about 300,000 to 350,000 tons of billets and slabs per annum. The ingot capacity is about 400,000 tons per annum.

"The property will be paid for by the guarantee of the United States Steel Corporation of the securities heretofore issued by the Clairton companies, aggregating a little less than \$13,000,000, and the delivery, to the vendors, of the United States Steel Corporation ten 60-year 5 per cent. sinking fund gold bonds of the par value of \$1,000,000. The properties are acquired free and clear of all floating liabilities or indebtedness.

Company recites the fact of the signing of the contract, and adds:

"The effect of the contract is to relieve the Crucible Steel Company from meeting the rapidly maturing obligations of the Clairton Steel Company, which have for the past 18 months been absorbing the earnings of the company to the detriment of their financial credit and the injury of their stockholders; and while in making the contract the Crucible Steel Company have made a considerable sacrifice, the contract for the supply of their raw material places them in as good a position in that regard as they were with the Clairton plant, and at the same time they are relieved from the heavy obligations of that company."

The annual meeting and dinner of the Boston Metal Trades Association were held at the Trade Club, Boston, Wednesday evening, April 27. The election of officers resulted as follows: President, Henry F. Arnold, American Tool & Machine Company, Boston; vice president, Duncan D. Russell, James Russell Boiler Works, South Boston; secretary, E. B. Robinson, Atlantic Works, East Boston; treasurer, A. L. Lovejoy, Becker-Brainard Milling Machine Company, Hyde Park. These officers also constitute the Board of Directors.

The Inwardness of Automobilmism.

BY MARIUS C. KRARUP.

It was originally thought and intended that automobiles should take the place of horses in solving the world's short haul transportation problems. They have done nothing of the kind as yet. It was also thought that their main advantages would be their economy and reliability. This hope, too, has so far been disappointed. The automobile, as it has been developed, no more takes the place of horses and horse drawn vehicles than bicycling takes the place of walking.

A craze for speed, when that quality was discovered to be easily within reach and to hold a charm of its own, overtook the automobile movement (at the Bordeaux-Paris race in 1895), and gradually changed all the original intentions of its leaders; as a mere temporary digression from worthier objects, it was thought, but the movement lost its bearings then and there and has never found them since. It is astray in fads and fancies, as everybody knows, and only a breach with some of its ten-year old traditions and "data" can bring it back to safe ground. This everybody does not know; in fact, it is roundly denied by many. The best men in the movement are, however, perfectly well aware that sooner or later there must be ten automobiles that pay for their going in dollars and cents for one that pays in pleasure, but they vaguely hope that the pleasure cars will show the way and furnish the capital for all necessary new departures. To what degree they are justified in this belief should appear from the following, especially from that in this article which relates to mechanics and designs.

So long as the automobile movement had an uphill fight against prejudice there was reason for dealing gently with its shortcomings and charitably with its misrepresentations, the latter being frequently only the delusions of unscientific builders. Only the rich bought machines, and they did not care how much the sport cost them. In fact, the cost was an attraction, because it promised the exclusiveness which had entirely vanished from the bicycle.

The Utility Automobile.

But the promise that the automobile would speedily be developed into a popular utility—on the strength of which promise indulgence was asked, and granted, for the vagaries of the sport—has been redeemed in only the most stinted measure. The automobile, while highly and expensively developed as an instrument of pleasure, does not rise to the level of a true utility—superior to previous means employed—except in those branches of work only in which sustained speed is a fancied or real requirement and economy a subordinate consideration. For the rounds of physicians and inspectors, for ambulance calls, for newspaper delivery the automobile meets certain demands, but the moment the foot rule of commercial economy is applied in earnest its ability to compete with the horse cannot be conclusively demonstrated, as proved by the relatively small number of merchants who have adopted it for light delivery work. When it is operated above horse speed and horse hours, the expense shoots upward through 100 channels; when not so operated its advantage is doubtful. Speed invariably means repairs, accidents and high tire bills.

The heavy electric truck, equipped with solid tires and operated not much above an average of 5 to 6 miles per hour, remains, in fact, the only form in which the utility automobile so far has made legitimate headway. All other instances that may be cited can be reduced to this: that at any given time some set of persons are investing time and money in gaining experience. If experience, once gained, had been greatly or at all in favor of the automobile, we should have heard the results proclaimed from the housetops by interested manufacturers, instead of seeing one after another of "business automobile" builders drop out of their industrial existence. We should see capital flowing in streams toward the manufacture of such useful vehicles, rather than in niggardly dribbles, and to those only who cater most cunningly to the fad end of automobilmism.

The Pleasure Automobile.

Now, there is no denying that the fad end of automobilmism holds a legitimate place, though legitimately only a comparatively small place. An automobile of high class furnishes a luxurious form of locomotion which can be obtained by no other means. It can be used so as not to encroach upon the rights of the general public, and yet give much higher speed and a vastly higher traveling radius than horses. Those who are willing to pay the price of this luxury should have it—under severe responsibility for its abuse—just as they should be able to have yachts and fine guns if they conform with the nautical regulations and don't discharge their fire arms where injury to others is liable to result. It is also true that a vast number of persons may find good use for an automobile, although they could never reasonably contemplate to keep horses, simply because the latter mean daily care and daily expense. To those whose lives are so ordered that the use of a conveyance for either pleasure or utility is desirable only at irregular intervals, the automobile means a raised standard of living, and this applies particularly to the many who like to drive and tour in summer but not in winter, on Sundays but not on week days. But it is an open secret among automobile trades people that nearly all belonging to this class have found the cost of keeping an automobile much higher than they had been led to expect and much higher than they can afford. The second-hand "for sale" columns of the press teem with their announcements of bargains, usually with a "reason for selling," which proclaims that some other reason is the true one, on the principle that he who excuses accuses. Their desire to sell inveigles them into a sort of tacit conspiracy for glossing over some of the facts which, it seems, must be made generally known before the "business automobile" can receive the attention it deserves.

The broadest general fact of this character is that the pleasure automobiles, though highly efficient while kept in good order, are not easily so kept, being infested with many faults which spring from too much attention to speed qualities and too little attention to those features which need to be cultivated if the construction shall be applicable to utility as well as pleasure purposes. These features, while first and indispensable for economy and practical transportation work, are at least second for pleasure cars.

To point out the neglected features in pleasure cars becomes therefore almost the same as to indicate some of the work that is required to be done before we may expect practical mechanical vehicles for everyday use in the business world. But the financial situation of automobilmism has so much to do with what has been done and what may be done in the future that it needs to be considered first in the briefest possible manner.

The American automobile industry is protected against foreign competition by an import duty of 45 per cent., and against home competition by a pool of patentees comprising the manufacturers of about 95 per cent. of the total output of vehicles. The legal validity of the patents, numbering about 500, in most cases does not extend beyond the narrow limits of weak "combination claims," but the force of the pool is exerted to ward off and postpone final adjudications; and meanwhile broad claims are asserted. At the recent automobile show between 400 and 500 "infringements" were noted by the pool's agents, who will now proceed to bring the infringers to book. Many of the infringements are by members of the pool against other members, and their adjustment means simply consolidation under the pooling agreement which has heretofore of necessity been only loosely enforced. Add to this situation that the designs of vehicles have undergone often radical changes once or twice each year, so that the "overhead expenses" must have been enormous, and that the much too low capital investment has rendered it necessary in all but a few instances to provide for enlargements of plants out of the profits from sales, and it becomes at once apparent that there has been every inducement to place the selling price of automobiles far above their intrinsic value as the same would be when measured in any established industry with reference to cost of material and labor entering directly in the prod-

uct. Everything that protects excessive prices protects also other manifestations of greed, and makes for low quality in material, workmanship and design—a tendency which has only partially been overcome by internal competition between pool members and what little other competition slips in over the tariff barrier, and through the loopholes in the patent wall. Design, particularly, has suffered.

Whether the infant automobile industry could have gained a foothold without a protective tariff is perhaps an open question, and whether the restrictions due to the patent pool—known as the Association of Licensed Automobile Manufacturers—will not in the end prove preferable to a cut throat competition such as undermined the bicycle industry, may seem debatable so long as capital refuses to back the industry on a basis of substantial preparatory work and long deferred profits, but what is of importance in this connection is that the condition as described exists, and has the effect of preventing the production of business automobiles, and will continue to prevent it while there is the least glimmer of hope of selling pleasure cars of present construction and at present prices. The moment the car of last year may be essentially reproduced this year, and next year these prices permit manufacturers to recoup themselves for heavy previous expenditures, but not till then. This is the stage which has been reached. Progress in general design has been arrested to bring it about. Certain accepted types of cars, varying in price from \$400 to \$4000, can be produced cheaply in quality, and 1904 should be a year of golden harvests for their makers, unless the public rebels.

The Demand for the Pleasure Vehicle.

The situation is this, then, that the whole industry is engaged in producing a commodity of luxury for which the demand is an unknown limited quantity; that the demand may dwindle or collapse at almost any time, not only from its natural limitations, but also because rapid deterioration of cars makes them look shabby within a year from the time of purchase or entails heavy repair bills and periods of nonavailability, which fact has not until lately been generally appreciated among the class of purchasers who must consider economy; further, that important improvements in construction may appear that will sweep present construction aside as completely as the steam pleasure vehicle, popular four years ago, has been swept aside by the gasoline motor vehicle, leaving only two steam cars still in the fight for popularity.

As the capacity of the industry is for at least 30,000 cars per annum, and at present perhaps 40,000 to 50,000 vehicles are in circulation, it is difficult to see whether the danger from waning demand, already at the threshold, or the upheaval that would follow radical innovations in construction is more to be feared.

Moreover, the cost of rubber tires is beyond the influence of the automobile industry. The cost, composition and quality of the fuel are determined solely by the Standard Oil Company, who have already taken the standpoint that the cost must be steadily increased, and that it is out of the question to produce either the gasoline or kerosene that would be best adapted for automobiles, but that the construction of the latter must be adapted to such compositions of these oils as may be most profitably produced considering the company's other and larger business and the limited supply of the raw material.

The business is built on sport and hope. It is kept going—like a spinning top under continual lashing—in a whirl of silly racing events and exhibitions. A superfluously numerous trade press, and as many of the daily press as will fall in line, are subsidized by advertising patronage to keep the public tuned up by means of a medley of grave discussions of nothing in particular, and a mass of inconsequential news about automobiles and the doings of clubs and associations to whose activities nothing whatever of merit can be traced either in construction, use or legislation—nothing but the publicity which is like the cloud of ink by which the cuttle fish reveals its existence while concealing its true whereabouts.

The exhibitions, or shows, serve the double purpose of keeping the public interested and of securing orders for automobiles from agents, whose paper is then sub-

sequently discounted by accommodating local banks and furnishes the means for continuing manufacture. That is the secret which explains why automobile shows are held in the midst of winter, though the public's interest would be more intense in April. With the prices obtained it should not have been necessary to depend on agents' orders for working capital, but it has been the bane of the business that the expense of keeping the fad alive goes on increasing. The industry's bill for advertising alone must have been from \$2,000,000 to \$3,000,000 last year, or about \$100 added cost for each car, excepting only the few manufacturers whose output exceeded, say, 500 vehicles. For a business subject to radical changes without notice this is, of course, too much. Racing shows, contests and agents' commissions must have aggregated at least a similar sum.

It was the good fortune of the electric branch of automobilism to suffer financial disaster in an early stage. Through the light shed over the economical and mechanical shortcomings of the electric cab, the electric truck and the electric carriage, a rational effort was made toward overcoming these defects by serious work, and the desired object has been accomplished in a measure. Where the power of a large steam plant, preferably one kept going for other main purposes, is available, and where the care and charging of batteries can be systematized and a force of drivers kept on hand without too frequent changes of *personnel*, electric traction can be made self sustaining and in many respects preferable to horses. The Edison battery, also an upshot of the recognition of defects, furthermore promises much increased durability of the batteries, obviation of current leaks and other advantages.

Neglected Points in Construction.

Among the points in construction which have been neglected in the rush for recovering money spent in experiments, the most fundamental ones are also most subject to dispute. They refer to the first principles in motor designs and to the fuel. Other points, being more obvious, may better be mentioned first.

The Inflated Tire.

Probably the greatest misfortune to automobilism as the basis for a new industry was the existence of the air inflated rubber and canvas tire when the automobile was still in its infancy. The air tire had given good service under the light loads of the bicycle. Its adaptation to the motor vehicle forced the evolution of the high speed car, which should have come last, nipped investigation of other forms of spring suspension in the bud, reduced the dimensions of wheels, created the dust nuisance, and still presents unsolved problems. A degree of inflation sufficient to protect the rubber and canvas casing against deformation under the traction resistance (and the rapid destruction resulting therefrom) causes light cars to bounce and gives them small advantage of the spring effect. Under heavy cars, on the other hand, impacts against the casings are too severe for their material, whatever the air pressure, especially at high speed, and in default of better means for obviating early destruction the walls of the casing are usually so thickened with numerous layers of canvas that much of the elasticity is lost, especially that localized yielding to small obstacles which constitutes the air tire's main advantage over metal springs. They do protect wheels against lateral jolts, however, but this virtue is of great value only when high speed is a requirement, as lateral jolts amount to very little under other circumstances.

On a 4000-mile trip I made last summer the average consumption of gasoline was about 1 gallon to 15 miles, or 266 gallons in all. The price varied from 30 cents to 17 cents per gallon, averaging, perhaps, 25 cents, making the total expense for gasoline \$66.67. Six pneumatic tires were used up, and a start made on the seventh. By extensive repairs they could be made to serve a little longer, as a matter of demonstration; but for all practical purposes the six tires were ripe for the scrap heap. Their cost was \$300. The cost for tires was thus four and half times as great as that for fuel. The car with all on board weighed, most of the time, about 3000 pounds, but it seldom traveled over 15 miles per hour. With a lighter

car and over better roads the tire expense would be smaller, but so would the gasoline bill. If, on the other hand, the speed had been higher—and most motorists travel much faster when the road permits—the tire expenses would have jumped much higher, while the gasoline bill would have come down somewhat. Some of the roads on the trip referred to were exceedingly rough, but I doubt whether automobile users in general can point to much more economical results per mile, even with lighter cars.

There can hardly be any doubt but that the same amount of capital and energy which have been employed in the improvement of air tires, if directed upon the development of other forms of elastic support, would have produced results of much wider acceptability.

Automobile Springs.

In practice automobile builders have relied on the makers of carriage springs to design automobile springs, and on the air tires to make good the deficiencies of the springs. Carriage springs designed to support a certain weight, say, 2000 pounds in an ordinary vehicle, are either too stiff and weak or of too slow recovery after jolts for even the most moderate speed of automobiles. Lately something has been done to remedy this by buffers, but this is acknowledged to be only a sad makeshift for emergencies. The subject requires to be studied from the ground up, not so much with reference to heavy automobiles intended for carrying dead loads, but especially for conveyances intended for speedy service in carrying persons economically over all kinds of road surfaces. It is evident, for example, that for light stage and livery work pneumatic tires, being subject to time wasting accidents, are poorly adapted, while effective spring action is a requisite.

Protecting the Machinery.

One of the most obvious defects in automobiles is illustrated strikingly in the streets of New York every day. Under many of the most elaborate and gorgeous "touring cars" a tarpaulin or piece of canvas is stretched, looking very much out of harmony with the fine upholstery and polished brass. It serves to intercept the lubricating oil from above and dust and mud from below. The necessity for it is anything but a compliment to designers. It is inconceivable that it should always remain a necessary feature; hence we inquire: Why is it so now? All have seen the puddles of lubricating oil that disgrace the cement floors of garages. They generally come from the transmission gear boxes rather than from the motor, and bear witness that oil tight casings are the exception and that an oil circulating system, providing for the return and re-use of oil and the removal of the detritus from gears by filtration, has not yet been devised. While it is probably true that such a system presents more difficulties in automobiles than in any other form of machinery, considering that not only are compactness and slightness required, but also allowances for the effects of much shaking, jolting and twisting of the vehicle frame, it is also true that such a system, or some equivalent for it, is indispensable in automobiles, so long as toother gears are used, and that all slobbering of oil and grease is a serious drawback to the employment of mechanical vehicles in many forms of business. Efforts have been made to remedy this, but no case of notable success may be mentioned. It is only by comparison with automobiles of several years ago that it becomes possible to realize that this point has not been entirely overlooked. The dripping of oil is not in itself sufficient to explain the underslung tarpaulin, however. To clean the underside of an automobile from street dust and mud is an undertaking so considerable that it is generally left undone. Like some beetles, whose shining wing covers, eyes and antennae present a very tidy appearance, when turned over on their back reveal an underside infested with parasites, most automobiles seen from below show incredible collections of filth in the many corners and crannies of the mechanism. To clean the underside of the auto with a stream of water is considered bad practice; the filth, caked on, is less injurious. Besides, the water would get into many places where it is not wanted. Cars driven through a bevel

gear shaft from a motor over the front axle to a differential gear actuating the rear wheels by an articulated shaft which passes through a hollow rear axle and is keyed externally to the wheel hubs, are least objectionable in this respect, and in one (foreign) car of this type a sheet steel bottom, extending under the motor, the steering and the change speed gears, is also provided. Laughable though it is, its makers or agents claim exclusive patent protection for this feature, which, in a general way, is obviously no more patentable than the simple encasing of any other machinery. The fact, however, illustrates one of the hindrances to progress.

Undoubtedly all automobiles would nevertheless long ago have been protected underneath if it had not been for three or four additional reasons. First, in the days when something went wrong with the mechanism once or twice per day, and the motor was mounted in the vehicle body, repairs had to be made from below and a pan or other protecting cover would have been much in the way. So the industry and the public got accustomed to the "open chassis." Later, when accessibility for most repairs was effected by placing the motor in front and by the ready removal of footboard and seat, the openness, though plainly the earmark of an experimental vehicle, remained, because people were accustomed to it and to change it meant expense and added weight. Secondly, builders imagined that access of air from below and in every other direction helped to keep the motor cool. Even the German manufacturer who introduced the fan blower for this purpose at first saw no better way to provide for egress of the air sucked in than to leave the motor foundation open. Air slits in the motor hood still remind one of that stage, which is not by any means a past one with every builder. Many of them still place the fan—if they use it at all—so as to drive air from the larger to the smaller cross section. The lessons of the forced-draft furnace and ventilators have not been consulted.

In some American cars with the motor under the middle the need of underneath protection is remarkably pronounced, but absolutely disregarded. In most French cars, and those patterned after them, there is a tendency to dispense with protection under the whole chassis by massing the mechanism in front and rear while having nothing under the middle excepting a driving shaft with protected joints. But this tendency is not yet general.

Occasionally one sees on certain American cars semi-circular leather flops suspended from the steering knuckle to prevent mud splashing from front wheels on the unprotected motor. This is especially the case where cooling by water pipes is not employed. If the cylinder were caked over with mud it would heat up rapidly and probably fire prematurely. The expedient employed to prevent this seems very crude, however, and amateurish.

The Cooling System.

No other feature in design indicates as clearly as the cooling system how little any other than fast driving in the summer season has been under contemplation. It is notorious that the cars in which cooling is effected by the ordinary coil of pipe with radiation fins but without a fan, cannot be driven for one hour at high power development, and at slow speed (as with a heavy load or in hill climbing) without boiling the cooling water, so as to lose it by rapid evaporation and eventually overheating the motor. These cars are still in the majority. In the winter, on the other hand, their cooling water will freeze and burst the pipes or motor jacket, unless the motor is kept running while the car stands still, or else calcium chloride or glycerine is mixed with the water. Other cars in which the temperature of a (smaller) quantity of cooling water is more energetically held down by the so-called cellular or honeycomb cooling system assisted by one or, still better, by two fans, operate satisfactorily in summer, but the soldered seams of this system are likely to leak and the water passages are so narrow that an antifreezing admixture will clog them, so that in winter the motor must be left running while the car stands still. With the four cylinder motors of the high-priced cars this is not ordinarily in itself absolutely objectionable, as the motor may be throttled down to run very softly, but in some States it has been made unlawful to leave an unattended car with the motor running, and,

in business, cases would easily arise where a motor would be left running for several hours, consuming fuel unnecessarily, and liable to stop at any minute for some trifling cause, with the result that the attendant on his return would find the costly cooling apparatus seriously damaged by the freezing of the water.

Even with mere pleasure driving in view these imperfections of water cooling have driven the industry to a fresh trial of air cooling in some instances. And certain results have been accomplished which promise well for even heavy slow work, but not until new means shall have been found for increasing the metal radiation surface of the cylinders and placing them in the path of a positive air current and in a place where the radiation surface may not become coated with mud or other material of small heat conductivity.

If the cooling problem had been attacked without placing main reliance in the speed of the car as a means for carrying away the heat, the attack would have been directed upon the factors which cause excessive heat generation and wasteful use of fuel. But for a long time the opposite was done, so as to secure more power for high speed in an engine of a given size and weight, irrespective of the fact that the same power would not be available for the low speed of a business vehicle, because the excess of heat could be disposed of only when the car was going fast. The short stroke engine of high piston speed would hardly have been the only form developed if a number of engineers had worked on gasoline motor design with the transportation of merchandise in view. Neither would they all have accepted the customary conversion of reciprocating piston motion into rotary crank action which constituted the principal obstacle to the employment of a long stroke. The long stroke, with its more complete utilization of the gas expansion, is, of course, much more strongly indicated for the internal combustion engine, with its complete waste of the exhaust, than for the steam engine that returns to the boiler the larger portion of the heat in the exhaust steam. But a long stroke, with crank motion, meant side pressure on the piston, increased vibration (or the need of more perfect balancing of the moving parts) and loss of compactness. The crank motion was, and is, the most convenient means for accomplishing the induction, compression and exhaust strokes through fly wheel momentum, and to devise another method seemed a long shot for the mere matter of getting a long stroke and facilitating cooling, so long as a car was judged almost entirely by its high speed qualities, which are served admirably by short stroke and crank action, save for the great waste of power at the dead centers. But it can hardly be doubted that eventually the business vehicle will be driven either by a rotary motor or by a multi-cylinder reciprocating motor in which the piston rods deliver the full force of each explosion tangentially to a rotary shaft, thereby allowing twice the time and twice the surface for cooling, as compared with present conditions, and rendering air cooling perfectly practicable with the highest power development. Only for the speed craze the capable engineers who have produced the really marvelous engines found on high-class pleasure cars—marvelous, but irrational for aught but speed work—would probably have done as well for the automobile beast of burden by this time. What cooling problem, here so deeply involved, means for slow-moving vehicles doing hard work, may perhaps be best realized by contemplating the size of the water tank used with stationary gasoline engines. No such dimensions are available for vehicles, but something must be done to produce equivalent results for the slow speed utility car, good for winter and summer alike; and it has not been done yet. It has not even been attempted in earnest.

Other Fuel Than Gasoline Needed.

Much could be said on the subject of the neglect shown in regard to experiments with kerosene and especially with alcohol. If they were necessary for speed they would be much further advanced than they are, even in Europe, as may be judged from the fact, picked at random, that for example not a single series of experiments has come to be known in which complete atomization of these less volatile hydrocarbons is at-

tempted by any other means than that employed in the well known atomizers for perfumed waters; the substitution of steam for the air current being a mere variation and not available for internal combustion engines. Eventually the industry must, of course, be made independent of gasoline, of which the visible sources of supply are even now insufficient, and our method of awaiting the discoveries and inventions that may be made in Europe—on the principle that it does not pay to be a pioneer—may in this case cost our industry a couple of years of stagnation during the eventual period of transition from the present fuel to a better one.

The General Electric Company.

The annual report of the directors of the General Electric Company to the stockholders for the year ended January 31 last shows net profits of \$7,865,376, including royalties and profit from securities sold and after allowing for depreciation. From this amount were deducted \$76,007 for interest on debentures and \$1,470,098 representing the amount written off from the patents and other accounts of the Stanley Electric Company, leaving a balance of \$6,319,270. The dividends paid during the year were \$3,508,284, and the surplus as of December 31 last, including the amount carried over from the previous year, was \$7,293,688. On the general conditions governing the company's business the report says:

"The disturbed financial and other unsatisfactory conditions of the past year have considerably affected your business, and the percentage of profit upon business done is smaller than for the previous year; the increased price of copper, higher priced and less effective labor, large expenses in developing steam turbines, and lower selling prices have all contributed to this result."

The balance sheet as of January 31, 1904, is as follows:

<i>Assets.</i>	
Cash	\$3,289,445
Stocks and bonds.....	14,665,346
Real estate (other than factory plants).....	424,082
Notes and accounts receivable.....	15,207,480
Work in progress.....	2,046,488
Merchandise inventories:	
At factories.....	10,488,464
At general and local offices.....	1,247,754
Consignments	69,899
Factory plants.....	6,500,000
Patents, franchises and good-will.....	2,000,000
Total.....	\$55,938,961
<i>Liabilities.</i>	
3½ per cent. gold coupon debentures.....	\$2,049,400
5 per cent. gold coupon debentures.....	82,000
Accrued interest on debentures.....	683
Accounts payable.....	1,810,664
Unclaimed dividends.....	1,825
Deferred liability on account of purchase of Curtis	
Turbine patents, payable in installments, up to	
February 1, 1906.....	
Capital stock.....	\$834,000
Surplus	43,866,700
.....	7,293,688
Total.....	\$55,938,961

* The patent investment for which this liability was incurred has been charged to profit and loss.

Considerable attention is given in the report to the advantages of electricity as a motive power on railroads as compared with steam, and the interesting claim is advanced that "the popular apprehension of the 'deadly third rail' is without foundation as regards danger to the public—there is not a recorded instance of a passenger being killed by the third rail." The reduction in the operating expenses of the Manhattan Elevated from 55.8 per cent. in 1901, when steam was in use, to 44.7 per cent. in 1903, when the motive power was electricity, is instanced as a proof of the saving secured by a change from steam to electricity. Referring to the order secured some months ago from the New York Central for 30 electric locomotives, Third Vice-President E. W. Rice says: "We believe this order is the forerunner of many others to be placed by steam railroads."

William Carl has been made master mechanic of the Brown-Bonnell Works of the Republic Iron & Steel Company, Youngstown, Ohio.

Power and Speed Controller.

The demand for a device with which to obtain wide and rapid changes of speed in machinery is becoming greater with improvements in many lines of manufacturing. In fact, in some machinery such control is necessary to secure the results aimed at. It is to meet this demand that the Power & Speed Controller Company, Boston, Mass., are putting on the market a controller which is

toggle joints to spring out. By this action a collar is forced back, compressing a spring, causing it to exert on the adjacent rolls, and at the same time by exerting pressure in the opposite direction pulls the other outer disk over on its adjacent rolls. Both pairs of rolls are held in an upright position by coming in contact with the inner disks. The spring between the left hand pair of disks serves as a releasing spring; when the clutch is thrown out and the clutch spring is exerting no pressure

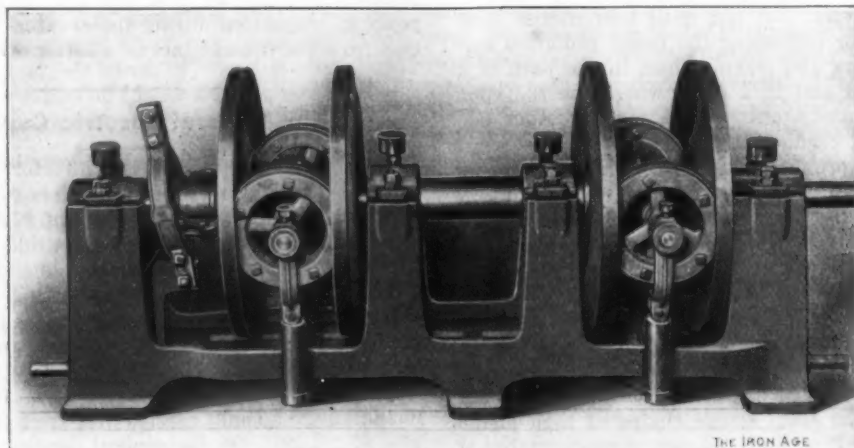


Fig. 1.—Elevation of the Power and Speed Controller.

compact in form, and, as demonstrated by careful laboratory tests, is uniformly efficient under widely varying speeds.

The principle embodied is the working of friction rolls between annular grooved disks mounted in two pairs, the radius of the rolls being the same as the radius of curvature of the grooves in the disks. The rolls are so mounted that they can be set in contact with the disks at any point in their grooved surfaces, as shown in Figs. 1 and 2. The inner disks are carried on a sleeve, which runs in the two inner bearings. This sleeve also carries a pulley or gear (not shown) which receives the drive from the line

pressure in both directions. This action of the spring pushes the outer disk, which is splined to the shaft, over the outer disk is forced away from its rolls, thus insuring the stopping of the controller promptly.

By the action of the clutch spring the two outside disks are pushed or drawn toward one another, which counteracts all tendency to end thrust. From the fact that the thrust is self contained, the efficiency is naturally high, the only loss between the source of power and its application after passing through the controller being that consumed by the shafts turning in their bearings and whatever friction may come from the rolls operating on

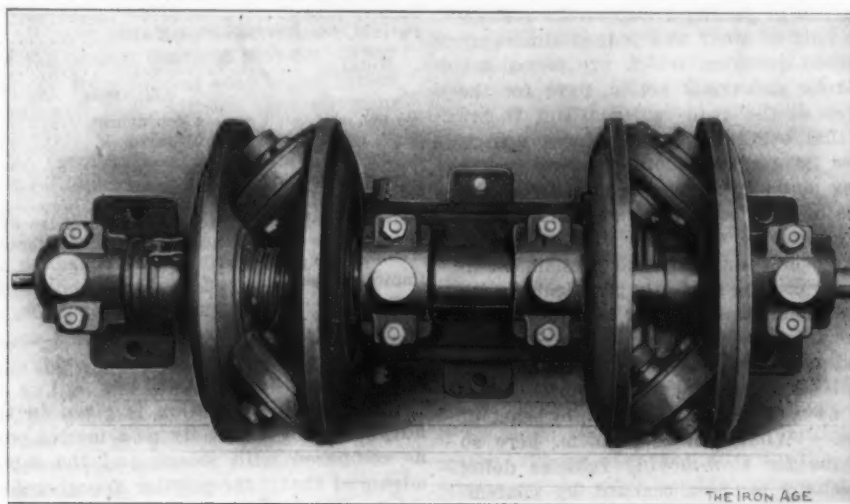


Fig. 2.—Top View, Showing the Relation of the Rolls.

shaft or whatever is used to drive the controller. The main shaft runs in the outer bearings at either end of the frame and carries the outer disks, one being keyed and pinned fast to the shaft, while the other is splined on it. To vary the speed the rolls are swung simultaneously about their points of support by turning the rod in the base of the frame (best shown in Fig. 3) which carries worms meshing into sectors pinned to the supports of the rolls. The clutch shown at the left, Fig. 1, is pinned to the main shaft and turns with it. The driving pressure is obtained by throwing the clutch lever and causing its

the disks. Laboratory tests made on a 15 horse-power controller showed that the efficiency averaged a trifle over 80 per cent. on speeds ranging from 129 to 450 revolutions per minute. In the operation of the controller the variation of speed is $7\frac{1}{2}$ to 1, and the gradation is complete. Where it is desired to produce more rapid changes in speed than is possible in the device as described, levers attached to a sliding rod in the base are used in place of the worms and gears.

While it is generally found convenient to run the pulley or gear on the sleeve at constant speed and to ob-

tain the variable speed from the shaft, it is equally feasible to run the shaft at constant speed and to take the variable speed from the sleeve.

The controller may be used either as a hanger or floor stand, or may be directly connected or built into the machine to be driven. The main shaft can be extended to any length, and may carry either a pulley or a gear. The speed control rod may also be extended.

This controller is also manufactured with a single pair of disks and rolls, but this practice is not recommended, excepting where the power to be controlled is very small. With this double type of controller, with the two pairs of disks and rolls, a more powerful machine is obtained in less space than where a single pair of disks is used. It is as feasible with the double type to construct a controller to transmit 100 or 150 horse-power as it is one to transmit 2 or 3 horse-power. The frame is cast solid in one piece to secure the greatest rigidity.

The Senate Postpones the Eight-Hour Bill.

WASHINGTON, D. C., May 3, 1904.—The last official act of the Senate Committee on Education and Labor, prior to the adjournment of Congress on April 28, was the postponement until next December of a vote on the national Eight-Hour bill. This action completed in a most comprehensive and satisfactory manner the programme outlined by the manufacturing and employing interests of the

of its opponents, who laid before the majority leaders statements showing the dangerous character of the measure, which induced the leaders to exclude it from the legislative programme. But for the stubborn opposition on the part of manufacturers the bill would have reached the Senate much earlier in each of the three Congresses, and it is difficult to say what its fate would then have been.

At the session just ended most significant changes were wrought in the sentiment of both House and Senate committees with regard to this bill. After hearings which were no more protracted than in previous Congresses, the House committee, with but three negative votes, decided to refer the bill to the Department of Commerce and Labor for a full investigation. This suggestion was made to both committees in the Fifty-seventh Congress by Judge McCammon, counsel for the iron and steel and shipbuilding interests, but was unceremoniously rejected as unworthy of serious consideration.

Having failed in the House, the labor leaders turned their attention to the Senate, where, with the co-operation of Chairman McComas of the Senate committee, the bill, contrary to all precedent, had been taken up before its passage by the House. Final action by the Senate committee was deferred owing to several happenings in no way related to the contest over the measure, but on the 27th ultimo Chairman McComas issued an urgent call for a meeting of the committee, which was seconded by a

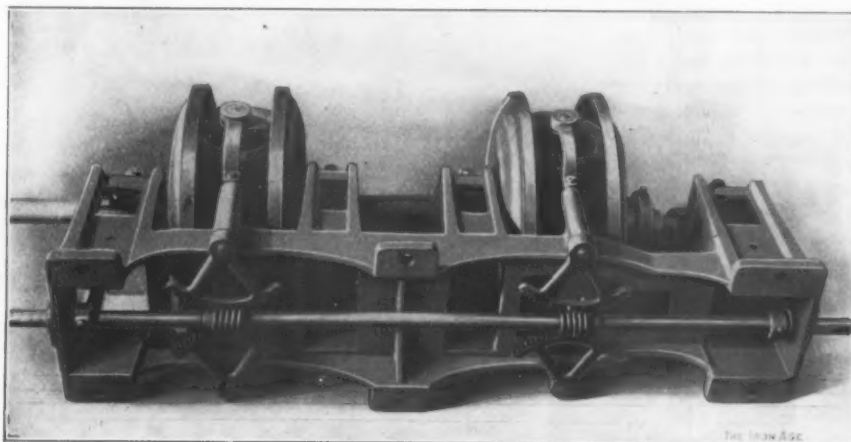


Fig. 3.—View of the Under Side, Showing Mechanism for Simultaneously Changing the Position of the Rolls.

country last November to prevent favorable reports on this measure by the House and Senate committees. When it is remembered that the same interests succeeded in defeating the Anti-Injunction bill, the scope and importance of the work accomplished will be fully appreciated.

Great Change in Sentiment.

The astonishing change in sentiment in both Houses with regard to labor legislation, which has been brought about chiefly through the energetic work of the National Association of Manufacturers in its campaign against the Eight-Hour and Anti-Injunction bills, can only be fully realized by a comparison of the record made in the recent session by these measures as compared with that in previous Congresses. In the Fifty-fifth, Fifty-sixth and Fifty-seventh Congresses the House Committee on Labor reported the Eight-Hour bill almost unanimously, and at no time was there more sufficient adverse sentiment in the committee to induce those who doubted the wisdom of this legislation to file a minority report against it. On all three occasions the favorable report on the bill was promptly followed by its passage in the House without the formality of a roll-call, a highly significant fact, which shows that the opponents of the bill either could not summon the necessary one-fifth of the members present to demand the yeas and nays, or else hesitated to place themselves on record against the measure. On no occasion was the passage of the bill by the House preceded by debate of any kind, and the consideration and passage of the bill on no occasion occupied more than ten minutes.

In two of these three Congresses the Senate committee reported the bill favorably and in no case took adverse action upon it. Its final passage by the Senate was prevented only by prompt and vigorous work on the part

note to each member from the American Federation of Labor, urging favorable action on the bill. Mr. McComas had given notice that he would insist that the committee should "vote the bill up or vote it down," but Senator Dolliver, of Iowa, submitted a substitute motion postponing action until December, which was carried by a vote of four to three. Two absent members are reported to have recorded their votes later in favor of postponement, making the vote six to three, or equivalent to two to one.

The Effect of the Campaign.

The history of the Anti-Injunction bill has already been recorded in these dispatches. While reported to the House almost unanimously in the Fifty-seventh Congress and passed by that body with hardly a dissenting vote, the bill in the session just ended was postponed until December by a vote of ten to five. These results are due solely to the fact that public men have become convinced that the manufacturers and employers of the country are organizing, not only for the purpose of protecting themselves, but with a view to making it politically safe for a public man to do what he believes to be right and best for the country, without fear of the assaults of the demagogues. The work of such organizations as the National Association of America, the National Metal Trades Association and other similar organizations has shown what can be done by concentrated, well-directed effort, and it is an interesting and highly suggestive fact that no class in the country is more highly gratified at the success of these organizations than the Senators and Representatives in Congress, who have thereby been made to feel more independent than ever before in the course of their public careers.

W. L. C.

The Woods Automatic Knife Grinder.

Of the new machinery which has recently been placed on the market, the knife grinder illustrated herewith, brought out by the S. A. Woods Machine Company, Boston, Mass., seems to have attracted considerable attention. It is intended for grinding wood planer, paper veneer, leather splitting and other straight knives, and is claimed to accomplish the work with unusual accuracy. Inasmuch as planed lumber is very often found inferior because of the poor condition of the cutters due to imperfect grinding, the importance of accurately ground planer

matic feed referred to is provided with a safety stop, which guards against overgrinding, and the operator having placed the knife in the machine and set the gauge which regulates the amount to be ground may start the machine and give his attention to other work with the assurance that the knife will be ground as intended. The amount of feed per stroke can be made as fine as 0.00025 inch. The travel of the carriage is automatic in either direction, and is controlled by adjustable dogs, seen on the front of the machine, which throw the reversing lever. The knife bar is supported at either end by rigid uprights between which it is clamped when in grinding posi-

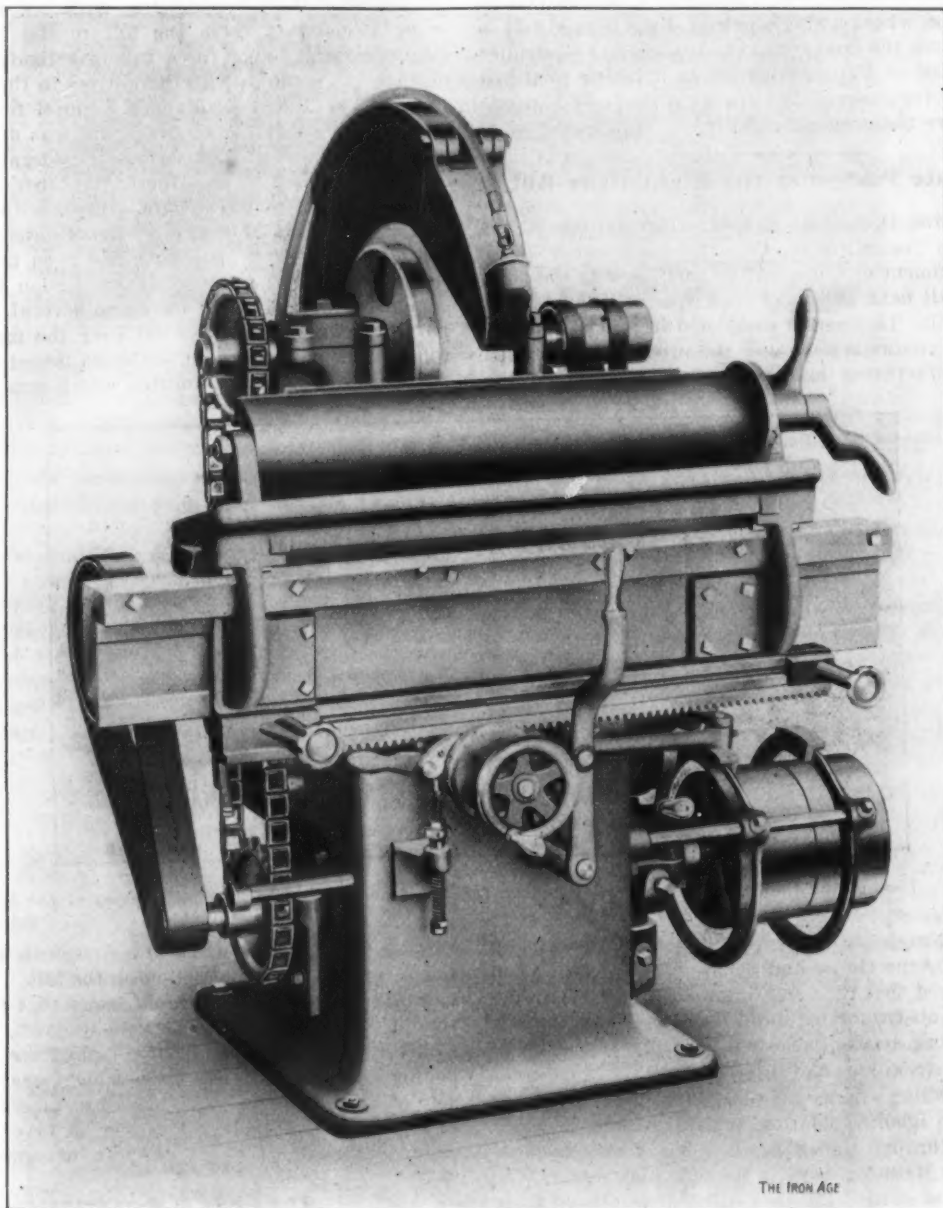


Fig. 1.—Front View of a New Automatic Machine for Grinding Wood Planer Knives, &c.

knives is appreciated by the producer of dressed lumber. Fig. 1 is a front view of the complete machine, and Fig. 2 a closer view at one side.

Among the improved features in this machine an important one is the design of the ways in the extended bed for the traveling knife carriage. It affords protection to the sliding surfaces of the carriage against particles of dust or emery, and is largely instrumental in obtaining great precision in the grinding of the knives. The nature of this construction is best indicated in Fig. 2.

The automatic cross feed of the wheel and stand is also an important improvement. The wheel stand is gibbed to the base, and is automatically advanced to the work at each passage of the knife carriage. In many mills the knives are sharpened on semiautomatic machines, where the wheel is fed to the work by hand, and the results obtained are seldom satisfactory. The auto-

tion. T-slots are provided for bolting on the knives and for locating the gauges that insure grinding the knife parallel. The knife may be placed on this bar to grind either against or away from the cutting edge. For sharpening the back of bevel knives such as are used in the manufacture of hard wood floorings, there is a provision such that no resetting of the bar is necessary.

Another device worthy of notice is the hydro-pneumatic pump, which furnishes a continuous supply of water to the work, obviating the likelihood of the knives being hollow ground, a result frequently attending dry grinding, due to heating, which causes expansion. In connection with the cooling of the knife by water, there is a reservoir from which after the removal of emery or particles of grit the water is drawn and used over and over continuously. A hood adjustable to conform to the wear of the wheel prevents the throwing of water.

The machine is styled the Woods No. 221 full automatic knife grinder, and is built in sizes to grind up to 30, 36 and 42 inches in length. Larger sizes require longer beds, and are only built on special order. The 30-inch machine occupies a floor space of 3 x 5 feet, and weighs 1800 pounds.

A Canadian Export Duty on Electricity Improbable.

NIAGARA FALLS, N. Y., April 28, 1904.—Considering the vastness of the electrical power development on the Canadian side, the question has arisen as to whether or not the Dominion of Canada shall assess an export duty on electricity generated in its territory and transmitted across the river to the United States. In the franchises granted by the commissioners of Victoria Park, and ratified by the Ontario Government, it is provided that the companies shall from the electricity or pneumatic power generated supply power in Canada to the extent of any quantity not less than one-half the quantity generated

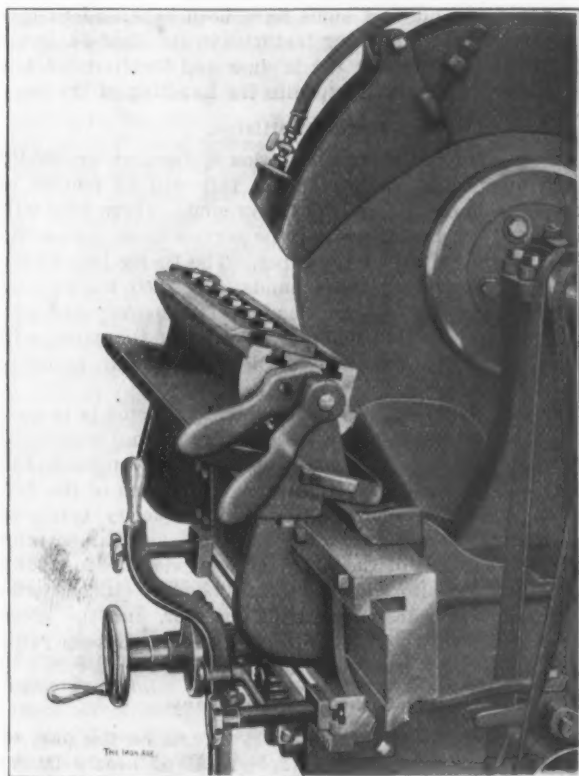


Fig. 2.—A Side View of the Knife Carriage.

at prices not to exceed the prices charged to cities, towns and consumers in the United States at similar distances from the Falls of Niagara for equal amounts of power and for similar uses.

In this there is an implied consent to the exportation of at least one-half the amount of power generated, and it is fair to assume that the great works have been carried on, at least by two of the three constructing companies, under the belief that the Dominion would not interfere with such exportation. Of late a feeling has been growing along the Niagara border and among the various municipalities of Ontario within the zone of prospective benefit from the Niagara development that the Government should place an export duty of about \$15 per horse-power on electric power generated in Canada and transmitted to the United States. Such a duty would be almost prohibitive in its nature, so far as the border transmission or export is concerned, and the result would be that about all the power generated in Canadian Niagara would be kept at home for the upbuilding of that locality.

While such a result would no doubt form a pleasant picture for loyal Canadians to consider, the truth is, or

at least the present demand makes it so appear, that it will be many years before the Canadians could hope to use the enormous amount of power now contemplated to be developed in Victoria Park. Of the three companies now holding franchises, the Canadian Niagara Power Company will develop 100,000 horse-power, while the franchise of the Ontario Power Company covers 150,000 horse-power, and that of the Toronto & Niagara Power Company 125,000 horse-power, or a grand total of 375,000 horse-power. Of course, it is far from likely that this amount of power will be available for many years; but should the three companies proceed as energetically as they are now doing, and develop their franchise rights to the utmost, Canadian Niagara would be simply swamped with power, if it were not possible to transmit some of it to market across the river in the United States. In fact, with the right of such transmission, there is no demand for such a quantity of power within the zone of profitable transmission about Niagara today. It has all along been pointed out that the great power plants of the Niagara Falls Power Company and of the Canadian Niagara Power Company would be of great and important usefulness to each other in case of serious accident to either, for the interchange of current service would simply increase the advantages offered by the constant current service of the Niagara power development.

The petitions that have been circulated on the Canadian side to have been extensively signed, and will be presented to the Government. What their effect will be remains to be seen, but it may be taken from what General Francis V. Greene has said that officials are committed to allowing a free transmission. General Greene is manager of the Ontario Power Company, and he is quoted as saying:

"There is no such probability. So I have been assured by Canadian gentlemen who are in positions to know whereof they speak. Such a course would be folly on the part of Canada. The revenue derived from the transmission of power goes to the maintenance of the park on the Canadian side. At present the park is thus self supporting. The Canadians have all the power that they wish. If a duty was to be levied upon the power transmitted over here, the park commissioners would simply lose that revenue which they now receive from the American franchises. Canada is well protected in the matter. There is a stipulation in existence which provides that if the Canadians so wish at any time they may have one-half of the power. They have no use for such an amount, so why should they not dispose of the superfluous power to the Americans? I have been absolutely assured that official and popular sentiment in Canada is strictly opposed to the imposition of any such duty."

The South Pittsburgh Iron Works.—The South Pittsburgh Iron Works, Claysville, Pa., have recently erected a structural shop, have installed punches, shears and a rotary planer, and expect to build all kinds of structural and bridge work. The new equipment will be in operation in 30 days. Two electric cranes will be added to the plant, one of 5 tons capacity in the unloading yard and one of 10-tons capacity in the loading yard. A 100 horse-power gas engine will be installed in the power plant. E. J. Heaton, formerly of the Robert W. Hunt Inspection Company, and also of the American Bridge Company, has been appointed general manager.

Antwerp will probably soon occupy the first place among European Continental ports, owing to the great accommodation and facilities afforded and to its superior geographical position as a port and as a distributing center. It cannot be long, however, at the present rate of progress, before the resources of Antwerp are taxed to their uttermost, and some anxiety is felt as to the capacity of the port to receive the ever increasing influx of ships. This year new quays have been opened further up the Scheldt, with a length of 2166 yards, thus bringing the total length of the quays up to 5416 yards.

THE LOUISIANA PURCHASE EXPOSITION.

ST. LOUIS, Mo., April 30, 1904.—The Louisiana Purchase Exposition was formally opened this morning with all the pomp and splendor that is appropriate to the inauguration of an event of such international importance. This is easily the largest and greatest of all world's fairs, having also greater practical educational value than other fairs. This desired result has been attained by the consistent and persistent policy of the officers of the fair to apportion space in proportion to the live interest and educational value of the exhibit rather than the wealth of the concern exhibiting. No charge has been made for space, and the amount given to the exhibitor was left to the discretion of the chiefs of departments. As much as possible, exhibitors have been encouraged to install what are known as live exhibits. In other words, in the case of machinery, for instance, the machines are in operation and doing actual work. Much wisdom has also been exercised in the arrangement of exhibits in logical sequence, so that the visitor is oftentimes able to follow the course of material clear up to its most highly finished state by passing from one exhibit to another in the same section of the building.

Faultless weather and the largest crowd ever attending the opening day of a fair contributed to make the ceremonies a brilliant success. It was 12.14 noon when the pressure of a button by the President of the United States set in motion the machinery of the exposition, including the grand cascade. It was a most impressive spectacle and was greeted with the "Star Spangled Banner," sung by the crowd, with uncovered heads. Externally the fair is in an admirable state of completeness. The slough of mud gave way before an army of workers in three days, and the crowds could find their ways about the grounds on gravel roads and cinder paths. The grand canal which separates the main buildings of the exposition was enlivened by gayly decorated gondolas and their picturesque gondoliers, with scores of launches also chugging their way backward and forward on the clear water. Unfortunately the intramural railroad was two or three days behind time in completeness, and it was impossible for that reason for the visitors to find their way to the distant parts of the grounds as they would otherwise have done.

Transportation Facilities.

In spite of the fact that the attendance was larger than had been expected or was hoped for, the transportation lines were able to take care of the traffic with less difficulty than had been feared. In fact, the city of St. Louis and the exposition authorities, backed by the efforts of steam and electric roads, seem to have solved the problem of transporting passengers to and from the fair grounds.

The Wabash "shuttle" trains, so called because a locomotive is attached to each end, are operated on double tracks between the Union Station and the fair grounds, and are exclusively used for passenger service during the world's fair period, the terminals being at the Union Station and at Lindell boulevard entrance, without intermediate stops. These trains are equipped with cars especially built for this service, with a seating capacity of 100 passengers each. They have side entrances for loading and unloading, passengers entering at one side while others leave at the other.

The Wabash Railroad operates trains equipped with ten of these cars, with a total seating capacity of 1000 passengers to the train, with maximum of 1500 passengers. They purpose running these trains as frequently as the traffic demands, it being possible to operate them on a two-minute schedule without any interruption through the fact that certain of their through passenger trains will be operated over the same tracks. With the block system in vogue it will be possible to run these trains on a one-minute schedule.

In addition to this service there are seven double track street car lines from the central part of the city to the

world's fair grounds. The transportation departments of these lines advise us that they can handle 10,000 people per hour by each line. This we discount, but we do believe that under normal conditions they can handle 3000 per hour on each line. On this basis we figure a minimum capacity of 35,000 people per hour and a maximum capacity of 60,000 per hour for the steam and electric roads combined. In addition to this there will be two, possibly three, automobile lines, with a minimum capacity of 1500 and a maximum of 3000 per hour, as well as numerous cabs, busses and wagons operating between the city and the grounds.

Doubt is often expressed as to the ability of railroads entering St. Louis to take care of the extremely heavy passenger service incident to the fair, particularly because of the obstacles presented by the fact that there are only three railway bridges connecting St. Louis with points to the East. Railroad officials believe that they have solved the problem, and vast sums have been expended to this end, in enlarged switching facilities in the East St. Louis yards and in equipping the bridges and their approaches with systems that will expedite the handling of trains.

Hotel Facilities.

As a relief to the transportation systems an unusually large number of visitors to the fair will be housed in hotels inside or just outside the grounds, where they will have only occasional use for the service lines connecting the grounds with the city proper. The Inside Inn, at the southeast corner of the grounds, has 2250 rooms, and this, together with a large number of temporary and permanent hotels within walking distance of the gates, will give over 6000 rooms, which will accommodate probably 12,000 visitors.

In its permanent downtown hotels St. Louis is in poor shape to care for the crowds, as under normal conditions her few good hotels are crowded. This condition has been somewhat relieved by the recent opening of the Jefferson and the transformation into temporary hotels of hundreds of stores and warehouses in the business and residence sections of the city. Accommodations for many thousands of visitors are being furnished by citizens, who rent rooms to transients during the fair, and the great number of such rooms will probably serve to keep rates down to a fairly reasonable figure.

Great Obstacles Overcome.

As the result of extraordinary efforts on the part of the management, and the employment of nearly 30,000 men working in three eight-hour shifts day and night, what would normally be a month's labor has been completed in the week just closing.

In the matter of exhibits the lack of completeness reported three weeks ago has been largely corrected, and the percentage of completeness in the various buildings is about as follows: Machinery and Power buildings, 75 per cent.; Transportation, 65 per cent.; Varied Industries, 70 per cent.; Electricity, 80 per cent.; Manufactures, 85 per cent.; Liberal Arts, 80 per cent.; Mines and Metallurgy, 95 per cent.; Agriculture, 80 per cent.; United States Government, 90 per cent.

In general, the fair is more complete on opening day than was the Columbian Exposition at Chicago or the Pan-American at Buffalo. The floods, with the fact that many of the freight yards on the east side of the river are submerged, has delayed the delivery of hundreds of cars of exhibit materials. As it is, claim is made that as high as 6000 cars have been handled this present week into the fair grounds. This estimate is probable excessive, but certainly a vast tonnage of freight has been handled in a manner that reflects credit upon the men who are in charge of that branch of the exposition.

Foreigners Much in Evidence.

The visitor to the fair is struck with the ubiquity of the suave Frenchman and the alert Japanese, and it is evident that these two nations are represented more

largely than any other foreign countries. Germany, of course, is very prominent in heavy iron and steel industries, but it is understood that the long siege of hard times that Germany has been having the last few years has resulted in a material curtailment of her displays. Great Britain is prominent also, but not so much in the lines that would interest readers of *The Iron Age* as in others of a lighter sort. The Russian is conspicuous for his absence, the original plan to erect a Russian building on the grounds having been vetoed at the time of the breaking out of the war with Japan. South and Central American countries are not as prominent in this exposition as had been hoped by its officers, though Mexico has stepped into the breach to give a good representation from Latin America.

The whole flavor of the exposition is fully as cosmopolitan as the Chicago Fair, and herein lies one of its great educational features. Representatives of every race and almost every nation of the globe are here, the oddity of their raiment adding not a little to the charm of the exposition.

Labor Exactions.

Exhibitors in all the buildings complain bitterly of the inadequate quantity and poor quality of labor furnished by the exposition authorities. The whole fair is unionized to a degree that is startling. Exhibitors are not permitted to bring in their own employees to set up their exhibits, machinery, &c., but are compelled to draw on the exposition authorities for what labor they need, taking men furnished regardless of their inexperience in the particular work at hand, though they are permitted the use of one superintendent to direct the work. Laborers practically unskilled, though holding union cards, are able to make from \$5 to \$8 in an eight-hour day on the scale of prices that is now being paid, and complaint is made on the part of exhibitors that the whole aim of the labor unions seems to be to make the job last as long as possible because they realize that as soon as the work is completed the men will be out of work, and it is their plan to make a year's wages in a few weeks. The fact that the fair is in an incomplete state as it is charged to this "soldiering" programme of the labor unions.

A General View.

The grounds are about $1\frac{1}{2}$ miles long and about $1\frac{1}{4}$ miles wide, the main buildings lying in the northeastern portion of the grounds, or the portion of the grounds nearest to the city. Twelve hundred and forty acres are included inside the inclosure. The northeastern portion of the grounds is almost level, while the balance of the inclosure is hilly and wooded, giving added charm to the cluster of buildings and features that have been erected on hillside and in valleys among the trees. The masterpiece of the exposition is the grand cascade, and it was a thrilling moment when the pressure of a button by President Roosevelt at Washington set in motion the three great pumps, which sent their 105,000 gallons per minute of filtered water running down the terraced slope of this cascade.

It is out of the question for us even to name all the exhibitors in this fair, though it is our purport to publish descriptions of individual exhibits that possess merit, either because of their beauty or their educational value.

The Gas, Fuel and Power Building, sometimes spoken of as the Boiler House, has been described briefly in a previous article of *The Iron Age*, and the exhibits and installations there will be taken up in a future article as soon as the installations are sufficiently complete to permit of their being photographed.

Machinery Hall.

This building is about 1000 feet long, and the installations are arranged in groups, with reference to the character of machinery exhibited. The most noteworthy installation in this building is, of course, the 5000 horse-power Allis-Chalmers engine, which will be briefly described later. This occupies practically all of Section 36 in the center of the building. It furnishes power to the Exposition Company. Additional power is furnished by the four 2600 horse-power Westinghouse engines in Section 48 at the west end of the building, while the Intramural Railway is operated from six engines grouped in 42, 45, 46 and 49.

The Westinghouse Exhibit

occupies all of Section 48, besides 47, 51 and the western half of Section 34. It will include among other things, the largest steam turbine ever exhibited attached to a 4000-kw. generator; four 2600 horse-power vertical compound condensing engines, each with a 2000-kw. generator; a rotary 200-kw. converter; a small vertical gas engine of new type having a rating of 125 horse-power, or 75 kw., besides a long line of miscellaneous power tools and appliances.

Foreign Engines.

Section 52, just north of the Westinghouse exhibits, is taken up with foreign engines, as follows: Willans engine, built by Bradley Mfg. Company, Pittsburgh. This is a triple expansion type, single acting, furnishing approximately 1000 horse-power, direct connected to a 600-kw. two-phase standard generator rated at 2400 volts, 125 amperes. This engine furnishes power for arc lights in the building. The Mulhouse engine, built by the Société Alsacienne De Construction Mécaniques, is of the compound condensing tandem type, with cylinders 24 and 43 inches, 52-inch stroke, 94 revolutions per minute. This is connected to a 700-kw. three-phase engine type alternating current generator, made by the same firm, and the power is used for arc lighting the building. This engine is not yet in operation, and will not be until toward the middle of May. The engine was built by the firm at their plants at Mulhouse and Grafenstaden in German Alsace, while the generator was built by the firm at their plant at Belfort, France.

A French engine, furnished by the manufacturers of the Belleville boiler, is to be installed at the west end of Section 52, but the materials have not yet arrived in St. Louis.

Section 53 is devoted to still exhibits of Heine and Cahall boilers, in detail, showing methods and materials of construction.

In Section 49 the Buffalo Forge Company show a 13 and 22 x 14 inch tandem compound engine, making 225 revolutions per minute. This engine is rated at 200 horse-power, and is attached to a Stanley alternating current generator, rated at 130 kw. The installation is used to furnish power for arc lighting for the grounds.

The Skinner Engine Company of Erie, Pa., in the same section show a 125 horse-power Skinner automatic engine attached to a generator made by the Warren Electric Mfg. Company.

The American Ball Engine Company, also in Section 49, have at work a 230 horse-power duplex compound engine, 14 and 22 x 16 inch, running at 230 revolutions per minute. This engine is coupled to an American Ball generator of 150 kw., which furnishes power for the coal conveying system in the power house.

Condensing Plant.

Section 50 and the adjacent 60 feet of Section 45 are occupied by Stilwell-Bierce & Smith-Vaile Company, Dayton, Ohio, with the following: A 4000-foot and a 7000-foot condenser; a single vacuum pump having 12-inch steam cylinders and 20-inch water cylinders, 18-inch stroke, and a compound pump having 12 and 22 inch steam cylinders and a 20-inch water cylinder, 18-inch stroke. The 7000-foot condenser handles the steam from the Hamilton turbine engine, which will be described later. The water is discharged from this condenser by a 14 x 24 inch cross-compound crank and fly wheel pumping engine 21½ inches diameter by 18-inch stroke. Cold water for the condenser is furnished by a two-stage dry vacuum pump having 12-inch steam cylinder, 18-inch air cylinders and 14-inch stroke. The exhibit will be a noteworthy one when completed. It was installed by H. Rehling, operating engineer for that company.

Intramural Plant.

To the right of the door as one enters the main north entrance of the building, and immediately in front, are grouped the engines of the Intramural power plant. The Brown Corliss Engine Company of Corliss, Wis., are setting up two cross compound engines, each 20 and 40 x 36 inch, running at 135 revolutions per minute under 150 pounds pressure. Each engine has a rating of 760 horse-power, with a possible overload of 50 per cent. The engines are connected together and form practically one

unit. They are attached to two Crocker-Wheeler 500-kw. generators. John Hoyer, superintendent of the plant, is giving the erection of these engines his personal attention.

Across the aisle, in Section 42, the Murray Iron Works Company, Burlington, Iowa, have in operation a 20 and 40 x 48 inch compound condensing Corliss engine of the Murray rolling mill type. The bed or frame is one massive casting bolted to the foundation its full length. The speed is 100 revolutions per minute. The shaft is 20 inches in diameter, the cross head pin 7 x 8 inches, the crank pin 8 x 8 inches. The cross head is of great strength and capable of easy adjustment. The cylinder is designed for 150 pounds pressure after two reborings and has double ported steam and exhaust valves, operated by separate eccentrics. The governor is of the high speed type, driven by a chain instead of the usual belt. An auxiliary governor controls an automatic safety stop.

Adjoining this is a 600 horse-power Fleming tandem compound condensing engine built by the Harrisburg Foundry & Machine Works, Harrisburg, Pa., having cylinders 15 and 26 inches in diameter. It is attached to a 400-kw. Crocker-Wheeler generator. South of the Harrisburg engine the Lane & Bodley Company have erected a 900 horse-power cross compound condensing engine with 20 and 40 inch cylinders, running at 85 revolutions per minute and direct connected to a Crocker-Wheeler direct current 600-kw. generator.

One of the most striking installations in this Intramural Power Plant is a 1500 horse-power Buckeye engine from the Buckeye Engine Company, Salem, Ohio, which is being erected in the corner of the building in Section 45. This engine is direct connected to a 950-kw. Crocker-Wheeler generator.

Other Power Plants.

Hooven, Owens & Rentschler Company, Hamilton, Ohio, occupy all of Section 46 with a 2250 horse-power Hamilton cross compound vertical engine, cylinders 34 and 68 x 54 inches. They are also erecting a 1500 horse-power Hamilton Holzwarth horizontal turbine, which has a speed of 1500 revolutions per minute. These two supply power to the Exposition Company for use in live exhibits.

Section 44 contains nine exhibits: General Electric Company, 114 x 30 feet (exhibit not yet installed); Wheeler Condensing Engine Company, 23 x 35 feet (not installed); I. & E. Greenwald Company, Cincinnati, Ohio, a Greenwald cross compound 600 horse-power engine in two units, with a 400-kw. Wood generator coupled between. This plant furnishes electrical power for charging the launches on the lagoon. The exhibit is installed complete. Others exhibitors who will have installations in Section 44 are: Houston, Stanwood & Gamble, Weber Gas Engine Company, Bessemer Engine Company and the Famous Filter Company of St. Louis. Exhibitors were prevented from preparing their space by the fact that heavy castings belonging to the Westinghouse installation covered the space up to the Saturday before the opening.

The Great Allis Engine.

The Allis engine is what is known as the horizontal or Manhattan type. It is 38 feet high and weighs 800 tons. The fly wheel is 25 feet in diameter; crank shaft, 37 inches in diameter and it weighs 51 tons; the cylinders are 44 and 94 inches in diameter and it has a 66-inch stroke. The engine was running on the opening day, though some finishing touches are still needed. It is direct connected to a 3500-kw. Bullock generator and furnishes power for electric lighting for the whole grounds.

Adjoining the Allis engine and in the same section is an Ideal 270 horse-power tandem compound engine furnished by A. L. Ide & Sons of Springfield, Ill. The northwest corner of this section is occupied by the Consolidated Engine Stop Company, New York, who will have quite an elaborate exhibit and will show some new features in engine stop apparatus.

Steam Pumps and Valves.

Section 33 is devoted to steam pumps and steam engine appliances and fittings. The largest exhibit is that of Schaeffer & Budenberg, who show a very large line of steam engine and boiler fittings and appliances. Half of

their space is devoted to German and half to American goods. The Goulds Mfg. Company, Seneca Falls, N. Y., who adjoin them, are installing an automatic fountain to advertise their pumps. A clever arrangement of electric light bulbs will furnish the visitors a constantly changing panorama of color. The Advance Pump & Compressor Company, Battle Creek, Mich., will have ten pumps and one air compressor on exhibition and will have two of the pumps under steam, showing the special characteristics of the Advance duplex steam pumps. Laidlaw-Dunn-Gordon Company, Cincinnati, Ohio, are installing air compressors for the operation of the compressed air power plant. The Cortland Company, New York, are putting in pumps in Section 33. Other exhibitors will be: Moran Flexible Steam Joint; the Rider-Ericsson Engine Company, New York, who will include in their exhibit a novelty in the way of a hot air engine carrying two pumps, one for surface pumping and the other for deep well pumping, either of which may be disconnected while the other is in service; Kiler Motor Company; Advance Steam Pump & Compressor Company, Battle Creek, Mich.; Davidson & Co.; Hug Water Wheel Company. It will be at least three weeks before the section is ready for visitors.

Sections 37, 38, 39 and 40, at the north entrance, are taken by foreign exhibitors and concessionaires. The major portion of Section 27 is occupied by the Buffalo Forge Company, in which will be shown a line of blowers and forges. Other exhibitors in the section are the American Steam Gauge & Valve Mfg. Company, Boston; American Balance Slide Valve Company, San Francisco, two new types of high pressure locomotive valves, one of slide and the other of piston form; Western Valve Company; Bashlin Company, Warren, Pa.; Wm. Powell & Co., Cincinnati; Crosby Steam Gauge & Valve Company, Boston, and Walworth Mfg. Company, Boston.

In Section 26 the Lunkenheimer Company, Cincinnati, have a fine exhibit of valves, ranging from 16 inches in diameter down to $\frac{1}{8}$ inch. The masterpiece of the exhibit is a mammoth plaster reproduction of their trademark, showing a hand holding aloft a valve. The Crane Company of Chicago have a large space in this section, in which they show a full line of steam, gas, water and engine supplies and specialties. A dozen French firms are represented in this section in a display of their lines of valves and fittings. Roe-Stephens Company, successors to the Michigan Brass & Iron Works, Detroit, and Philip Carey & Co., New York City, also have a space allotted to them, but the Lunkenheimer exhibit is the only one installed at the time of writing. The Roe-Stephens Company in their exhibit will make special features of their Hercules valve, Michigan compression hydrant, Michigan underwriters' hydrant; a large 30-inch valve, same as used in the St. Louis water works; a Pittsburgh 36-inch valve, and a 48-inch valve, such as built for the Cleveland water works, weighing about 23,000 pounds. There will also be a display of Scott goods such as have been manufactured by the Roe-Stephens Company in the past, including iron body gate, angle and globe valves, Scott & Orme pop safety valves and the Scott back pressure valve.

Section 19 is occupied by the Ashton Valve Company, Boston, who will have a complete exhibit of pop safety valves, pressure and vacuum gauges, among them the standard pocket test gauge described in *The Iron Age* of March 17.

Sections 10, 19 and 27, consisting of a row of booths 15 feet deep, extending about 300 feet along the wall of the building, are devoted to a display of valves and similar steam fitters' brass goods. Section 10 includes the following firms: Hancock Inspirator Company, New York; Hayden & Derby, Bridgeport, Conn.; Consolidated Safety Valve Company, Bridgeport, Conn.; Ashcroft Mfg. Company, Bridgeport, Conn.; Asbestos Roofing & Covering Company, St. Louis, Mo.; American Luxfer Prism Company, Chicago. The Ashcroft Mfg. Company will include in their exhibit the improved Tabor indicator, with outside spring attachment, which is readily accessible and at the same time not subjected to such intense heat as would occur were it inclosed in the cylinder. The Sherwood Mfg. Company, Buffalo, N. Y., in their exhibit of engine boiler supplies will show as their newest fea-

ture the Hart forced sight feed oil pump, which was described in *The Iron Age* of April 14.

Machine Tools.

Section 18 is divided equally between Warner & Swasey Company, who show ten machines, including hexagonal turret lathes, boring machines, screw machines, monitors and similar tools, and the Brown & Sharpe Mfg. Company, Providence, R. I., who will exhibit machinists' tools, cutters, gauges and kindred tools. The features of special interest are a measuring machine such as is used in their standard gauge department for establishing measurements and measuring standard gauge work that must needs be extremely accurate; a standard yard which was made and compared with the Government standard in the office of the Coast and Geodetic Survey at Washington, and a bevel rule 96 inches long.

Section 9 contains an interesting display of machine tools under the auspices of Manning, Maxwell & Moore, New York. The Betts Machine Company of Wilmington, Del., show a 72-inch planer, 5-inch slotter, No. 3 horizontal drill and 5-inch borer. Hendey Machine Company, Torrington, Conn., exhibit their Nos. 1, 1½ and 3 Universal mills; their No. 3 chain driven planer driven by a Northern Electric Company's motor and a No. 2 Universal planer, similarly driven; No. 2 chain driven milling machine; No. 2½ Lincoln miller, of which 240 were supplied to the Rock Island arsenal recently; 24-28 inch Hendey pillar shaper; 15-20 inch pillar shaper driven by Northern Electric Company's motors; 14 x 6 inch Hendey-Norton Lathe with improved gear box and taper attachment; 18 x 8 inch three-step cone lathe with improved gear box; 12 x 6 inch lathe and taper attachment and automatic stop and improved gear box; 18 x 6 inch motor driven automatic stop lathes; 16 x 6 inch automatic stop lathe with relieving attachment and a 20 x 8 inch size of the same machine. The Putnam Machine Company, Fitchburg, Mass., show a 42-inch engine lathe, No. 3 car axle lathe, 36-inch planer, No. 2 car wheel borer, 32-inch high speed lathe, 100-inch drive wheel lathe, 50-inch 300-ton hydrostatic press. Woodward & Powell Planer Company, Worcester, Mass., show a 30-inch, 36-inch and 46-inch planer, one of which is equipped with a variable speed countershaft, as described elsewhere in this week's issue. Foote, Burt & Co., Cleveland, Ohio, will show a No. 1 universally adjustable drill which will drill from three to six holes at one time in either straight line or staggered, with spacing of 1¼-inch centers up to 14 inches; a No. 1 independent feed adjustable four-spindle drill, the features of which are quick and accurate adjustment of the spindle, automatic trip throughout the feed at any required depth and back gears giving six changes of speed with three changes of feed to each speed; a No. 2 mud ring and flue sheet drill, drilling six or eight holes simultaneously and cutting work 12 feet 4 inches wide between the housings, and a standard arch bar drill. Cincinnati Shaper Company, Cincinnati, Ohio, 24 inch x 12 feet pull cut double head traverse shaper, description of which appears on another page; 18 inch x 8 feet push cut single head traverse shaper; 24 inch and 16 inch back geared crank pillar shapers. F. E. Reed Company, Worcester, Mass., 12-inch, 14-inch, 16-inch, 18-inch, 24-inch and 30-inch engine lathes, and a 16-inch lathe equipped with a direct connected variable speed reversing motor, doing away with gearing necessary where direct connected motor is used for thread cutting to produce a reverse motion on the spindle. It affords cutting speeds of from 35 to 200 feet per minute. J. E. Snyder, Worcester, Mass., two drill presses. Pedrick & Ayer Company, Plainview, N. J., railroad machine tools and appliances.

Wm. Sellers & Sons, Incorporated, of Philadelphia, Pa., will have a large display of machinery in Section 8, though their exhibit is not installed at the time of writing. They will exhibit a large new planing machine, operated by a pneumatic clutch, reference to which is made in another part of this issue, and several tool and drill grinding machines, as well as some injectors and shafting details.

Section 7 is devoted to a display of screw cutting lathes and machines built by the National Acme Mfg. Company, the Acme Mfg. Company, the Cleveland Automatic Screw Machine Company, all of Cleveland, and

the National Automatic Tool Company of Dayton, Ohio.

The National Acme Mfg. Company will show the Acme multiple spindle automatic screw machine, on which several radical changes have been made, and to which improved features have been added.

The National Automatic Tool Company will exhibit their regular Nuttings automatic multiple spindle drill press. Also one of the machines specially equipped for drilling sewing machine arms and a rotary platen machine. The latter has been changed recently, so that now the platen is elevated to meet the drills instead of depressing the drills to meet the platen.

The Acme Machinery Company will show a line of bolt, nut and special machinery, including 1½-inch double stay bolt cutter, which will thread to accurate pitch work 40 inches long; a 1-inch six-spindle nut tapper on which the shaft instead of being on top is about half way down, with the effect of lessening the vibration; a large power feed threading machine having a micrometer screw adjustment by which the operator may open or close the dies a little without losing his final adjustment; a 1½-inch steel bed bolt heading, upsetting and forging machine; a new type of hot pressed nut machine; a four-spindle bolt cutter; an automatic opening die bolt cutter and a horizontal automatic nut tapper.

Pratt & Whitney Company, Hartford, Conn., will occupy all of Section 17, 30 x 105 feet, with an elaborate display of their line of machine tools.

B. F. Barnes Company, Rockford, Ill., have a complete line of tools on exhibition in Section 12, comprising the following machines: One six-spindle 14-inch manufacturers' drill, one four-spindle 20-inch manufacturers' drill equipped with one auxiliary two-spindle drilling attachment, one three-spindle 23-inch drill, one two-spindle 20-inch drill equipped with oil pump and friction countershaft, one water tool grinder, one 12-inch friction driven drill, one 14-inch drill, one 20-inch drill complete, one 23-inch stationary head drill, one 26-inch stationary head drill, one 23-inch sliding head drill, one 26-inch sliding head drill, one 31-inch sliding head drill, one 31-inch machine equipped with belt driven motor, one horizontal drill, one 11-inch lathe with countershaft, one 9-inch lathe with foot power, one three-spindle 14-inch regular gang drill. The six-spindle 14-inch manufacturers' drill and the four-spindle 20-inch manufacturers' drill, as well as the water tool grinder, will be running machines driven by a 2 horse-power slow speed belt driven motor.

The Armstrong Brothers Tool Company, Chicago, exhibit will occupy a space 20 feet square in Block 12, and will be in charge of their G. W. Snyder. The exhibit will consist of a complete line of tool holders suitable for every operation on lathes and planers; also a complete line of planer jacks, clamp lathe dogs, Universal ratchet drills and samples of their machines for cutting off and grinding self hardening steel. The display was not installed on opening day.

Other allotments have been made in this section, but materials have not yet arrived for exhibits.

Heavy Machine Tools.

Hilles & Jones, Wilmington, Del., exhibit the 54-inch punch and shear described in *The Iron Age* of April 28.

Gisholt Machinery Company, Madison, Wis., occupy the space at the corner of aisles F and 3, Block 14, and will have in the neighborhood of a dozen machines there, all of which will be direct connected electrically driven machines. The exhibit will include a big bore turret lathe, a vertical boring and turning mill, a horizontal boring mill, a standard turret lathe and a Universal tool grinder.

Other exhibitors in this section who have reserved space are: Jones & Lamson Company, Erie Foundry, Erie, Pa.; American Stoker Company; Kempsmith Mfg. Company, Milwaukee; Power; American Machinist. The Jones & Lamson Company will show the lathe described in this week's issue.

A noteworthy exhibit of heavy tools will be that of Niles-Bement-Pond Company, New York, who occupy all of Section 25, about 90 x 100 feet in size. The exhibit is not yet installed.

Stamping and Drawing Presses.

E. W. Bliss Company, Brooklyn, occupy all of Section 24, size 35 x 85 feet, with a large and varied line of presses

and punches, many of which will be in operation doing useful work. The exhibit, which is one of the few that is fully ready, includes the following among other machines: A 1000-pound drop hammer for forging axes and hammers; a toggle joint press for drawing seamless tinware; two double crank presses for heavy shaping; a double geared bottom slide press for deep drawing; No. 69, a new triple action drawing press which performs three operations and takes the place of three machines and operatives in previous practice in the formation of such articles as tops of catsup bottles; another, No. 202S crank press, fitted with slide, a machine that takes the place of five operatives and five machines in making harness oil can tops and similar difficult work. The exhibit also includes a screw machine for rolling screws for bottles, paint tubs, &c.; a back geared press for stamping cutlery; two wiring presses for wiring pails; a press for stamping watch gearing; a machine for double seaming bottoms of tinware; a new bolt heading press; their No. 1 circular shear for cutting armature disks and the like; reciprocal feed embossing press, such as is used in the United States mints for stamping coins; a press for closing side seams of cylindrical tin cans; press for cutting blanks for seamless tin and black iron; a reducing press for reducing shells for student lamps and similar work; a press with double roll feed for feeding round pieces of sheet metal automatically. The exhibit is in charge of C. E. Pollard, mechanical engineer of the firm, and will be one of the most interesting exhibits in this part of the building.

Section 23, adjoining Bliss Company's exhibit, contains heavy machines exhibited by the Toledo Machine & Tool Company; the Nagara Machine & Tool Company, Buffalo; Fred. J. Swaine Company, St. Louis; Long & Alstatter, Hamilton, Ohio; Ferracute Machine Company, Bridgeton, N. J. The Swaine exhibit will consist of 40 or more machines for stamping and drawing sheet metal. We are not advised as to the machines that will be exhibited by the other firms named, although their products are well known.

Williams, White & Co., Moline, Ill., will exhibit a number of their machines, including a large bulldozer, with typical samples of work done on that machine; a 90-pound Justice hammer with the new rubber cushion spring, a Yeakley hammer, drop hammers, single and double end punches and shears. The bulldozer will be a No. 8, weighing about 50,000 pounds.

Section 13 contains a reservation for miscellaneous exhibits, but scarcely any material is on the ground. Reservations are booked for Sloane & Chase; National Oil Burner & Equipment Company, St. Louis; Prentiss Brothers, Becker & Brainerd, A. S. Aloe.

Section 29 adjoins that space and includes the Standard Railway Equipment Company, Franklin Moore and other firms. Scully Steel & Iron Company, Chicago, will exhibit the McGrath pneumatic flue welder in connection with the exhibit of the Standard Railway Equipment Company.

Wood Working Machinery.

J. A. Fay & Egan Company of Cincinnati have all of Section 21, in which they exhibit their lines of wood working machinery. Hall-Brown Wood Working Machinery Company of St. Louis show flooring machines, sash, door and blind machines, planing mills and the like.

Abernathy Vise & Tool Company, Chicago, Ill., will exhibit in Block 6 their instantaneous vise. Black Brothers Machinery Company, Mendota, Ill., will show their pioneer molding sander, Acme mortising machine, chain clamps, veneer presses, column clamps and quickset band screws.

H. B. Smith Machinery Company of Smithville, N. J., have been allotted all the space in Section 4, in which they will show a number of wood working machines, all of which are of new pattern, embodying recent improvements. These will all be driven by electricity, either by direct connection or belt. The machine of newest design is an improved 10-inch outside molding machine.

Byrkit Hall Sheathing Lath Company of Minneapolis show their sheathing lath machines in Section 3. It is claimed that 50,000,000 feet of sheathing lath for the St. Louis Fair were made on these machines, 40,000,000 feet

for the Chicago Fair and 30,000,000 feet for Buffalo. The exhibit illustrates the adaptability of sheathing lath to stone and tile walls and floors. The Macgowan-Finnigan Foundry & Machine Company, St. Louis, are installing one of their Perfect trip hammers and a House cold tire setter. Other exhibitors in Section 3 are L. & I. J. White Company, Buffalo, N. Y., who show coopers' machinery in an exhibit which is the same as their display at the Pan-American Exposition; Morris Bascom, the Stempel Fire Extinguisher Company of St. Louis and others.

Austin & Eddy, Boston, Mass., will have three machines. One is a standard pioneer molding sander with 8-inch heads, the second a smaller size of molding sander with heads 6 inches wide, and the third an Enterprise pulley mortiser, which will mortise sashes for four pulleys at one operation.

Pipe Machinery and Tools.

Section 2 also contains pipe machinery and tools. Bignall & Keeler Mfg. Company, Edwardsville, Ill., exhibit five machines, including one duplex No. 12 machine equipped with variable speed motor; a P. D. Q. C. No. 4, belt driven, described in *The Iron Age* of February 18; one Peerless No. 3 belt driven machine. The two motor driven machines will be operated by power furnished by the Exposition Company.

Wilmarth & Morman, Grand Rapids, Mich., exhibit six dry grinders, two wet grinders, one plain emery grinder, one arbor press, one friction countershaft and a line of Nelson loose pulleys. They expect to have in operation their style "D" direct connected motor driven drill grinder.

Coe Mfg. Company will also have a large exhibit in this section, but it has not as yet been installed.

The Borden Company, Warren, Ohio, will show several new features in pipe threading tools.

Artistic Display of Forgings.

In Section 32 J. H. Williams & Co. of Brooklyn have a revolving booth, on the circumference of which they exhibit a multitude of drop forgings. The tops of the panels of this booth are set with allegorical and historical pictures, illustrating artists' conceptions of Vulcan and his vocation. F. E. Myers & Brothers, Ashland, Ohio, occupy a part of the same section, although their materials have not yet been installed. P. Blaisdell Machinery Company, Worcester, Mass., show their lathes. Other exhibits in Section 32 are the Reliance Machine Tool Works, St. Louis, and W. E. Cook, Chicago, but the exhibits are not yet installed.

Well Supplies.

Section 35 is devoted to well supplies. The American Well Company, Aurora, Ill., show two air compressors, 11 deep well pumps, valves and fittings for deep wells and pumps and one rotary well drilling machine. They also take part in the working outdoor display in the wind mill field. Hersey Mfg. Company, Boston, Mass., show a line of water meters. Germany also has a large exhibit in this section and two or three other American exhibitors have been allotted space, but have not yet installed their exhibits.

Pulleys and Hoisting Apparatus.

Section 31 is devoted to transmission apparatus, the leading firms of the country being represented. Among them Medart Patent Pulley Company, St. Louis, Mo.; Reeves Pulley Company, Columbus, Ind.; American Pulley Company, Philadelphia; South Bend Pulley Company, South Bend, Ind.; Dodge Mfg. Company, Mishawaka, Ind.; New York Leather Belting Company, New York; Schultz Belting Company, St. Louis.

None of the exhibits was installed on opening day. The exhibit of the Dodge Mfg. Company, Mishawaka, Ind., will occupy 900 square feet of space, and will typify the Dodge American system of rope transmission. The entrance to their exhibit is through an arch made of hard wood lagging in half sections. The exhibit will include clutches, floor stands, wood split pulleys, iron center pulleys, textile pulleys and leading types of all their varied lines. A feature of the exhibit will be a Dodge iron center wood rim dynamo pulley that was tested at the works to a rim speed of 28,889 feet, or 5½ miles, per minute. This test was made for the purpose of ascertain-

ing the maximum rim speed at which a pulley could be operated without causing disruption. The rim speed indicated was the maximum speed available at time of test; it is their intention to again erect an arbor and try the pulley with increased power. Part of the exhibit is in motion, in order to show the ring and chain oiler and other features of their pulleys and shafts.

The Reeves Pulley Company will have as a unique feature of their exhibit a 20-foot pulley with a 52-inch face, probably the largest of its kind which has ever been constructed.

The American Pulley Company will exhibit a new patent pressed steel sheave in two sizes, 2½ to 12 inches in diameter, respectively, which are unique in being made up entirely without rivets.

Curtis & Co. Mfg. Company, St. Louis, Mo., have an exhibit, 55 x 64 feet, in Section 30, showing six compressors, two of which will be in motion. Over the compressors they are erecting a steel runway, on which they will have six of their small traveling cranes. Alongside the runway is a light observation platform, which will be reached by two compressed air elevators. Their compressed air exhibit will occupy about one-half of the exhibit space; the remaining half of the space will be covered by an exhibit of their standard saw mills, edgers, trimmers and saw mill machinery.

The Durable Wire Rope Company, Boston, Mass., will have a three-wrap rope drive constructed on the American system, with tension carriages, weights, &c., the drive to be run by an electric motor, and reels of rope of different kinds to show the structure and different sizes.

Lidgerwood Mfg. Company, New York, show hoisting engines. Yale & Towne Mfg. Company, New York, show their hoisting chain blocks and other hoists. The Brown Hoisting Machinery Company, Cleveland, Ohio, have an exhibit of hoists, and their traveling crane car is being used all over the building in moving freight from place to place. Stroudsburg Mfg. Company and the Power & Speed Regulator Mfg. Company have also been allotted space in this section.

A Novel Gravity Conveyor.

One of the interesting features of the fair is the gravity conveyor in operation in Section 22. This device is made by the Alvery-Ferguson Company, Louisville, Ky., and is in charge of Wm. M. Vaughan, the vice-president of that company. The device resembles somewhat a miniature railway, but in place of tracks, rollers are placed close to each other and a box or freight placed at the top of the inclined track gradually moves downward by force of gravity, turning sharp corners and being deposited at the bottom without shock. The rollers are hollowed in the middle, so as to keep the freight from sliding to the edges and engaging the steel guard. At corners the outer ends of the rollers are made much thicker than the inner for the same reason. Mr. Vaughan states that his appliance is being adopted by large packers, soap manufacturers and other firms who have large quantities of freight of uniform size to handle, and that actual tests show that one such conveyor, with an operator at each end, can do as much work as 12 men with trucks. Other exhibitors in Section 22 are E. & B. Holmes Machine Company, Buffalo, N. Y.; W. T. Adams Machine Company, Corinth, Miss.; Philadelphia Pneumatic Tool Company; Freireson & Rich, St. Louis; two German exhibits. These exhibits are not yet installed. The E. & B. Holmes Machine Company among their machines will have a Holmes Lightning cut off saw. The saw is 12 inches in diameter and will cut 18 inches wide; it occupies a floor space of 3 x 3 feet and weighs 500 pounds.

Grinding Tools.

No. 16 is divided between the Carborundum Company of Niagara Falls and Landis Tool Company of Waynesboro, Pa. Not yet installed.

Section 15 is divided between Norton Grinding Company and Norton Emery Wheel Company, both of Worcester, Mass. Not yet installed.

Gas Engines at the Fair.

Although hundreds of gas engines are to be exhibited in Machinery Hall, not a dozen of the engines were in-

stalled on opening day. The Westinghouse Company will have a number of gas engines in their end of the building. The Otto Gas Engine Company of Philadelphia occupy nearly all of Section 41. Among other things that will be exhibited there are one 150 horse-power gas engine, one 75 horse-power gas engine and seven gas engines of smaller sizes, ranging down to 2 and 3½ horse-power vertical gas engines. A 10 and a 40 horse-power will be belted to a Diehl generator. Another 10 horse-power horizontal pumping gas engine will be directly connected to an Otto pump and a 3½ horse-power vertical to a Deming pump. All the engines named will be running and do work. They also have "still" exhibits, including 15 horse-power hoisting engine, 50 horse-power marine gasoline engine, and a line of small portable gasoline engines for farm work and the like. The exhibit will be a noteworthy one because of the life and action, due to the working of the engines, and also because it will be brilliantly illuminated by hundreds of arc and incandescent lamps, power for which is furnished by the gas engine. E. A. Fischer, secretary of the company, is in charge of the exhibit.

Fairbanks, Morse & Co., Chicago, show seven gas engines, ranging from 2½ to 50 horse-power. These engines will be in operation and furnish power for electrically lighting the exhibit. In addition to this, one 150 horse-power gas engine will be installed, but will not be put in operation. The same firm show pumps, scales, hand power wind mills and other lines of manufacture. Their exhibit was not installed opening day. J. F. Willard is in charge of the exhibit.

The Luitwieler Pumping Engine Company, Los Angeles, Cal., exhibit a 4 horse-power railroad pumping engine (gas or gasoline) and a 15-inch paper stuff pump driven by a 7 horse-power gas engine, showing constant water delivery. The pump is of the deep well cylinder type. Their original intention to exhibit a small municipal pumping plant (1,000,000 gallons per day) was defeated by a strike on the part of the molders.

Olds Gasoline Engine Works, Lansing, Mich., devote 1000 square feet of space to showing stationary and portable gasoline engines ranging from 2 to 50 horse-power.

W. P. Callahan & Co., Dayton, Ohio, will exhibit three engines through C. D. Holbrook & Co., Minneapolis, general agents for the Northwest.

The Weber Gas & Gasoline Engine Company of Kansas City contribute to the power plant of the exposition one suction gas producer, one 126 horse-power gas engine and a 75-kw. direct connected generator.

Among other firms exhibiting gas engines will be the Foos Gas Engine Company, Springfield, Ohio, who will exhibit a 22 horse-power "Special Electric" engine with throttling governor; Hercules Gas Engine Works, San Francisco; Brown-Cochran Company, Lorain, Ohio.

These gas engines are all arranged in booths along the south side of the building in Section 34, Olds' exhibit being on the corner.

National Meter Company, New York City, will have in operation nearer the center of the building a number of gas engines ranging from 75 to 300 horse-power. One of these engines of 75 horse-power is coupled to a centrifugal pump which pumps 7000 gallons of water per minute. This water passes through a 30-inch Premier meter and over a weir. The rest of the gas engines are direct connected to electric lighting machines for illuminating this display. The National Company's exhibit will be one of the attractive features of the exposition, as it will be in effect a fountain in which a play of colored lights will attract wide attention.

Palace of Mines and Metallurgy.

Although a little out of the beaten track of the greatest number of visitors to the Fair, the Palace of Mines and Metallurgy will never lack for its full quota of visitors, because the exhibits there installed are of such a high character and so many of them are in active operation that it will be one of the buildings to be talked about and remembered.

Entering the main entrance at the northeast wall, one is confronted with the mammoth exhibit of the Bethlehem Steel Company, Bethlehem, Pa. This occupies sec-

tions 12, 22 and 32, and consists largely of reproductions of operations in the manufacture of armor plate and representations of armor plate and ordnance. The most striking feature of the exhibit is a mammoth representation in wood of a battle ship's forward turret, with two full sized heavy rifles, one 12-inch, the other 10-inch, and each about 40 feet long. By means of a motor placed under the turret it will be revolved and the guns trained in different directions.

Adjoining the Bethlehem exhibit is a display of abrasives, made by the Carborundum Company, the Norton Emery Wheel Company, the Pike Mfg. Company and Dr. Joseph Hyde Pratt, Government geologist. The Norton exhibit contains a complete object lesson of the method of producing abrasives from the ore to the finished product. Their alundum, or crystallized oxide of alumina, made at Niagara Falls, is displayed in its various phases. The Pike Mfg. Company show India oil stones, a gang saw for cutting stone, a rubbing bed, &c. Dr. Pratt's exhibit will show a large display of natural abrasives. The Wisconsin exhibit, which adjoins, will contain a huge tower built from various ores native to that State. Indiana's exhibit is not yet installed, though it will be largely devoted to a representation of coal, natural gas and oil developments of that State.

Largest Boiler Plate Ever Rolled.

The next tier of exhibits (Section 21) back of these are devoted to the States of New Jersey and New York, and to a display made by Worth Brothers Company, Coatesville, Pa. This last exhibit will be devoted largely to their manufacture of steel plates and boiler tubes. A striking feature of the exhibit is a partition between this exhibit and the one adjoining, consisting of the largest boiler plate ever rolled. It is 50 feet long, 149 inches wide and about 1 inch thick.

Sections 10, 20 and 30 and 10, 20 and 30 A are all devoted to a monster display of clay working, ceramic and brick industries; the *chef d'œuvre* being a brick building built of hydraulic pressed brick and illustrating fancy grades of brick.

Modern Wire Drawing Plant.

Section 2 is devoted entirely to the Morgan Construction Company, Worcester, Mass., and it will consist of a model wire drawing plant, including their suspended roof continuous heating furnace, for billets 30 feet long and 1½ to 2 inches square, and a section of the latest Morgan continuous heating furnace for 4-inch billets, such as is in use at the plant of the Lackawanna Steel Company. A six-stand roughing mill will also be shown, as well as a flying shear. The exhibit will be practically a reproduction of such plants as they constructed for the Grand Crossing Tack Company and others. At one corner of the exhibit will be installed a bundle of 30-foot billets, representing the product of a single heat in one of the Morgan furnaces. The J. R. George gas producer is shown in full size in this exhibit.

Section 31 is divided between the States of Minnesota, Michigan, Illinois, Ohio and Kansas, the mineral wealth of these States being displayed in a great variety of artistic groupings.

Section 40 will be devoted to mining and metallurgical industries of St. Louis, and Sections 50 and 60 to zinc, spelter, iron, coal and other metal and mineral industries of the State of Missouri.

Pennsylvania Will Be Represented.

Section 41 will be one of the most interesting exhibits of the whole building when it is completed. It occupies the large space in the center of the building and will exemplify the coal and iron industries of the State of Pennsylvania, including noteworthy exhibits from the Pennsylvania anthracite region and a collection of exhibits installed under the auspices of the Pittsburgh Chamber of Commerce.

Adjoining it to the west in Section 51 are displays from Louisiana, Nebraska, Kansas, Oklahoma, Indian Territory, Wyoming, North Dakota and Iowa. Of these the displays from Kansas, Oklahoma and Indian Territory will awaken special interest, as they will give the visitor an insight into the marvelous developments in coal, gas, oil and iron in that section of the country.

North Carolina has Section 50A; Utah, 70A; Maryland, 60 and 70. Section 61 is divided between the States of South Dakota, Arizona, Montana, New Mexico and Arkansas. Section 71 gives equal shares to Colorado, Idaho, California and the Colorado Fuel & Iron Company. This last exhibit promises to be exceptionally educational, though it is not yet sufficiently installed to permit of description. Oregon and Washington have each one-half of Section 80.

Mining and Assaying Machinery.

Section 81 contains an exhibit of the State of Nevada and a display by two individual Western firms. One of these, the J. George Leyner Engineering Company, of Denver, Col., will have one of their Water-Leyner rock drills in operation, their claim being that their drill is the only one in which a current of water is forced through a hole in the drill to the working point. A huge rock of granite on a raised platform in the exhibit will be riddled with holes during the life of the Fair, to the delectation of the visitors. They also show their air compressor, simple and compound, steam and belt driven, and hoisting engines, many of them in operation. F. W. Braun & Co., Los Angeles, Cal., show a long line of labor saving appliances for assayers, &c., consisting of laboratory crushers, pulverizers, gasoline burners, crude oil burners, illuminating gas burners, cupel machines, laboratory ore samplers, coronet rolls, crucible, muffle and combination furnaces, bullion melting furnaces and laboratory cyanide plants. They also have a display of tempering and forge furnaces and brazing burners and outfits suitable for the iron working trades.

In Section 42B, just back of the Bethlehem Steel Company's exhibit, will be installed the International Nickel Company and the Lanyon Zinc Company of Joplin, Mo. The transformer room for the power of the building is also in this space.

Model Mine in Operation.

In 42 and 52 the Fairmount Coal Company and the Consolidated Coal Company, both of Fairmount, W. Va., exhibit a miniature of their New England mine, reproduced in wood, canvas and staff, showing the whole hillside, with the miners' homes, the village stores, the power house and other structures connected with the operation of the mine itself. A series of coke ovens are also shown. Passing around to one side of the exhibit, a section of the mine itself is seen, showing mine cars and hoists in operation.

Section 62 is a composite exhibit in which are represented the Chicago & Wilmington Coal Company, the Porter Miller Engine Company, the Watt Mining Wheel Company, the Independent Coal Operators' Association of West Virginia, the Davis Collieries Company and the Williams Patent Crusher & Pulverizer Company.

Heroic Statue to Vulcan.

A statue of Vulcan in Section 72, fronting the southwestern entrance, will attract widespread attention. This is the masterpiece of the Alabama exhibit. The statue, which is made of iron, was cast by the Birmingham Steel & Iron Company. It is 55 feet high and weighs 110 tons. After the fair it will be transferred to what is known as Capitol Park, in Birmingham. The Alabama exhibit shows the products of the State of Alabama, chiefly iron and coal. Two pavilions have been erected, one showing the products of the Republic Iron & Steel Company, including bars, pig iron, coal, coke, &c., and the other is filled with the products of such companies as the Alabama Coal & Iron Company and the Tennessee Coal, Iron & Railroad Company, including steel rails and rail tests. The whole exhibit is surrounded with a fence built from tile and sewer pipe. The State Geological Survey also occupies a portion of the space with an exhibit devoted chiefly to the cement making materials which are now being developed prominently in the State of Alabama. The exhibit is not yet fully installed or more complete mention would be given.

The Iron Age Booth.

Very appropriately the booth of *The Iron Age* nestles near the feet of Vulcan. In this booth are shown bound volumes of *The Iron Age*, *The Metal Worker*, *Plumber and Steam Fitter* and *Carpentry and Building*, besides a

case full of technical works published by the David Williams Company. An album showing interior views of the David Williams Company's plant at New York and views of branch houses will be displayed in the exhibit.

Occupying a similar position adjoining the opposite corner of the Alabama exhibit will be the booth of the *Engineering and Mining Journal*, although this is not yet erected.

Section 82 is being installed by the Allis-Chalmers Company. In it they will show principally mining machinery, including a complete reduction plant. The exhibit was not sufficiently complete on opening day to permit of a description.

Section 83 is given over to exhibits of the States of Georgia, Idaho and Mississippi. Much of the space of Section 73 will be taken by the Austin Mfg. Company of Harvey, Ill., in the display of rock crushers, road machinery, well drills, mine cars and allied lines. This section will also include exhibits from the Ewald Iron & Steel Company, Rogers, Brown & Co., Arthur R. Barlow, Glasgow Iron Company and Taylor Iron & Steel Company, but it is too incomplete to permit of description at this writing.

Section 63 will contain exhibits of George Bell Company, Herman Ricker & Son, White Rock Company,

the development of her iron industries and her iron, gold, silver and other mining developments.

Austria, Italy, Ceylon and Siam have part of Section 23, but one of the most interesting installations in this section is that of the Trenton Iron Company, in which they are installing their exhibit from the Düsseldorf Exposition, showing the Bleichert aerial tramways in operation.

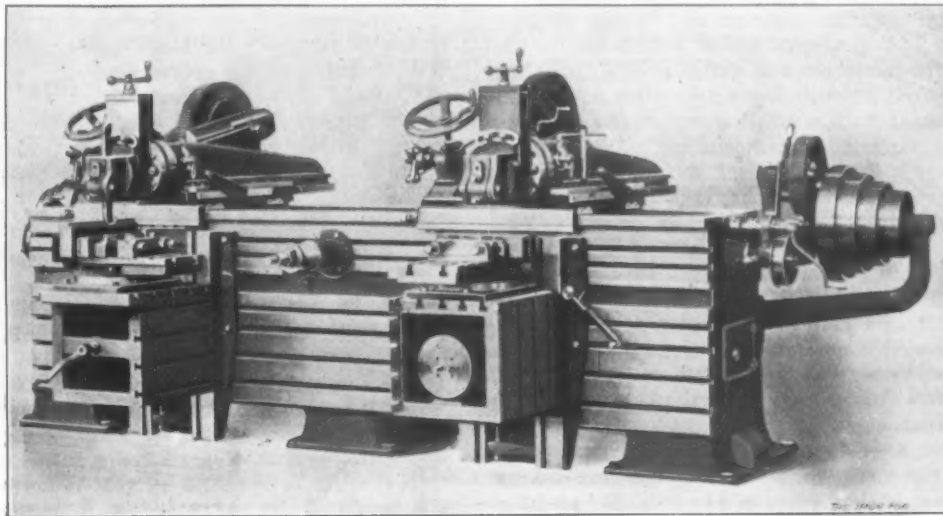
France and Venezuela occupy most of Section 13.

Argentine Republic has Section 14; Brazil, 15, and Cuba Section 4.

There are doubtless a score of other exhibitors in the building who have not been mentioned, but the exhibits were not installed at the time of writing.

Cincinnati Pulling Cut Traverse Shaper.

The difference between the shaper shown in the accompanying engraving and the ordinary type of traverse shaper is that it uses the cutting tools reversed, the cutting taking place during the backward motion of the ram and quick return during the forward. The advantage of the new arrangement is that the pressure, or thrust, of the tool is taken directly back against the bed of the machine, and tends to draw the table and apron more close-



A New Traverse Shaper on Which Cutting Takes Place on the Return Stroke Instead of the Forward Stroke.

United States Geological Survey, and exhibits from Kentucky, Texas and Tennessee.

Great Britain occupies all of Section 53 and her display of geological and topographical charts and illustrations will be of exceptional interest.

The Standard Oil Company have half of Section 43 and their exhibit promises to show the oil industry from well to refinery, though it is not yet installed.

Japan has a remarkable exhibit, occupying half of 43 and all of Section 44, and as one moves through it he is impressed with the rapid strides in mining operations and in the development in the manufacture of iron and steel that have been made by the Yankees of the East.

The United States Geological Survey occupies most of Section 74 with a noteworthy exhibit of great educational value.

Virginia has reserved 74A, the central figure of their exhibit being "Old King Coal" in heroic size, with two attendants representing coal miners.

The Knox Foundry & Machine Company have a portion of 64A.

Canada has all of sections 54 and 64, and the showing of our northern neighbors in their recent development of large iron and steel properties and industries will be one of deep interest when it is complete.

The exhibit of Germany in Section 33 is not yet sufficiently complete to permit of description, but it will be a large and interesting showing of the mining and engineering developments of our German brothers.

Mexico has 24 and 34 Sections, in which she will show

ly to the bed, rather than force them apart. This is especially desirable when heavy cutting, so common since the introduction of high speed steels, is being done. In many cases the work can be pressed directly against the bed of the machine, so that the resistance to the cutting does not depend upon the hard clamping of the work and the table. Large pieces can also be directly bolted to the bed, the tables being removed, which is preferable in certain classes of work.

The head is so constructed that the stress due to the cut comes directly upon solid metal contacts, and not upon threads, bolts or screw points, except on the set screws which hold the tool. These screws are large in diameter and have a long bearing. The head is rigid and strong in construction, and has little tendency to yield or spring under the cutting strain. Except for the head, ram and such other features as needed modifications, this traverse shaper is similar to the ordinary push cut machine heretofore and still made by the Cincinnati Shaper Company, Cincinnati, Ohio, the introducers of this tool.

An interesting hydraulic power plant has recently been started in Southern California by the Edison Electric Company of Los Angeles. The water pressure or head employed is equal to 1960 feet vertically, which is obtained in something over 8000 feet length of pipe line. This gives an effective pressure—after making allowance for friction losses—of considerably over 1900 feet head, or 825 pounds per square inch, equal to 55 atmospheres.

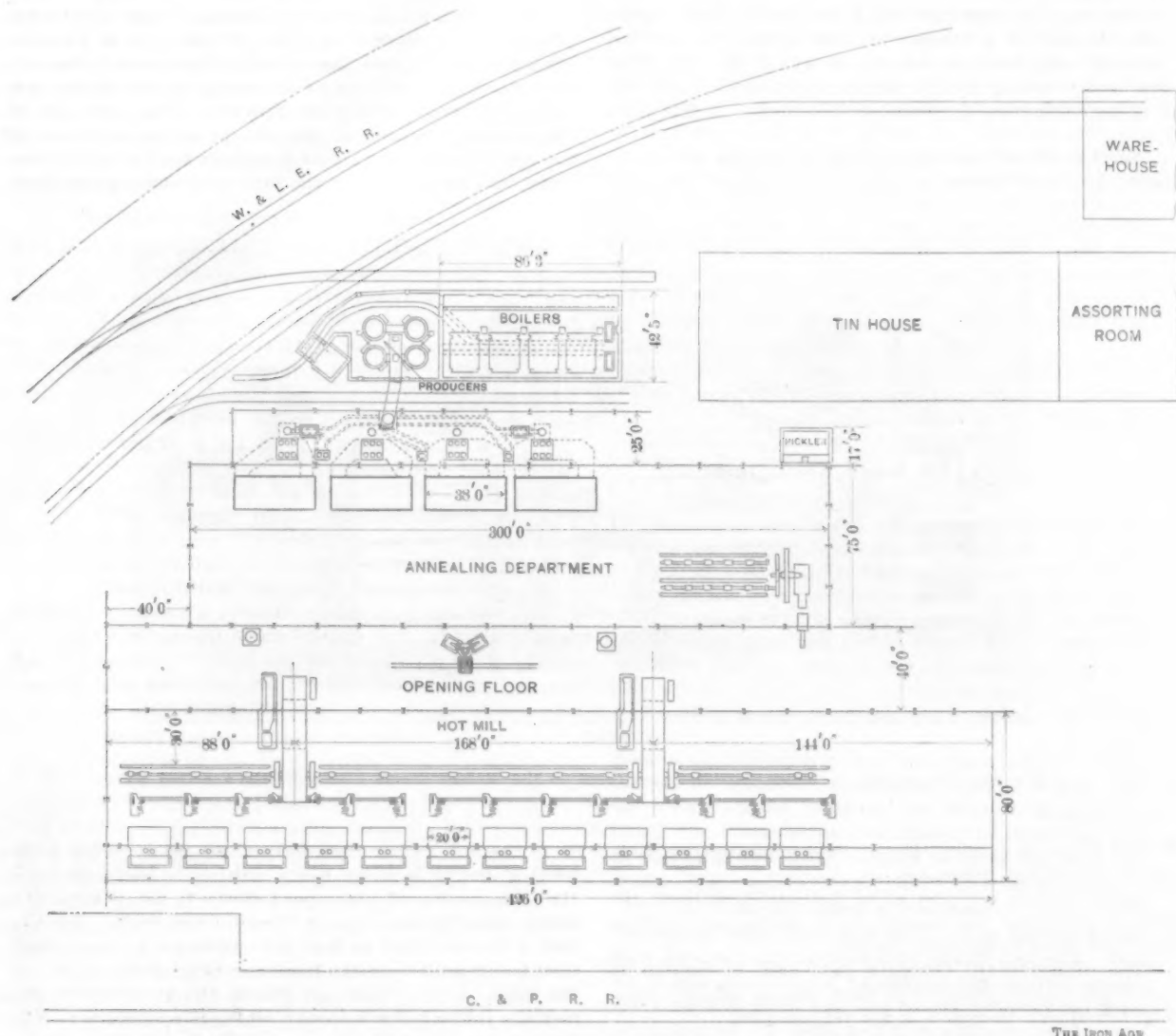
The Pope Tin Plate Company.

Through the courtesy of the Pope Tin Plate Company, Pittsburgh, Pa., a representative of *The Iron Age* was recently shown through the plant of that company at Steubenville, Ohio. This is the largest independent tin plate plant in the country. The site contains about six acres, three of which are covered with buildings, allowing ample ground to duplicate the present plant at any time desired. The works are located directly on the Pan Handle, Wabash and Cleveland & Pittsburgh railroads, with which it has direct switching connections, giving ample facilities for the receiving and shipping of materials.

The plant is a model one in every respect, money having been spent liberally when the works were built in

being unusually heavy. Seven of the hot mills are driven by a 36 x 60 Dickson Corliss engine, and five by a 30 x 60 Allis Corliss engine. Each hot mill is equipped with its own squaring shear. A feature of the practice in this plant is that all shearing is done in the day time. Results have proved that this gives the most accurate work, the chances of mistakes in the shearing being reduced to a minimum. The hot mill building is of steel frame construction and is 80 x 420 feet in size.

The plates after leaving the hot mills are sheared, opened and then moved to the center of the building, where they are pickled in a No. 2 Mesta pickling machine. The opening floor at the side of the hot mill building is 40 x 400 feet. The annealing building, which adjoins the opening floor, is 75 x 360 feet. It is commanded by two 10-ton Shaw electric traveling cranes and contains four



PLAN OF THE POPE TIN PLATE COMPANY'S PLANT.

order to secure the very best equipment for turning out tin plate of the highest quality, and to secure a large output at minimum cost. From the time the tin bars are unloaded until the finished product is loaded on cars for shipment there is no rehandling of material, but it is put through the various stages of manufacture in a practically continuous process.

The company use to a large extent open hearth tin bars, and in long lengths only, which are delivered into one end of the hot mill building on their own siding, where they are picked up by a 5-ton crane and deposited on the shear table. After being sheared to the proper lengths they are delivered onto crates, which are picked up by a crane, and the bars are deposited at the heating furnaces. The latter are of the single draft type, gas fired, the plant having 12 pair and 12 sheet furnaces. After being reheated the bars are taken to the hot mills, of which there are 12 stands, 26 x 32 inches, the housings

annealing furnaces. There are ten stands of cold rolls driven by a 30 x 60 Buckeye engine. There is also in this building a No. 2 Mesta pickling machine for white pickling. After leaving the white pickling the plates are run into storage tanks and brought into the tin house as required.

The tin house is a brick building 70 x 300 feet, absolutely fire proof. It is equipped with 16 duplex tinning sets, and employs all the latest methods of branning and tinning. The assorting and packing room is 70 x 132 feet, and contains two long assorting benches, one of which is operated in day time and the other at night. These benches are equipped their entire length with overhead electric lights, giving every facility for the utmost care in this important work in the manufacture of tin plate. After being assorted, counted and sheared the plates are boxed and loaded on cars for shipment, or else are piled in the warehouse. This is a fire brick building 64 x 221

feet, and is as nearly fire proof as it could be built. It was erected last fall, and has a capacity for storing 120,000 boxes of plate.

An electric light and power plant, recently added to the works, is located in a brick building at one end of the opening building. It is equipped with two 100-kw. Westinghouse generators direct connected to two 14 x 15 Harrisburg engines. There is also a machine shop in connection with the works, which is equipped with modern iron working tools. The boiler house is equipped with 2000 horse-power of boilers, the coal being received on the main line of the Wheeling & Lake Erie Railroad by trestle and dumped into storage bins. It is then elevated by a crane located inside the boiler house, and is fed to the boilers by automatic stokers. The boilers are equipped with chain grates.

The shipping facilities could not be improved upon. These consist of a sunken railroad track between the assorting room and the warehouse, which will hold four cars, while inside of the warehouse is another sunken shipping track running along its full length. It will hold 11 cars, and most of the shipping is done from it. By this method all plate shipped is kept perfectly dry. Underneath one side of the warehouse is a tunnel, arched with fire brick, which is 8 feet wide and 220 feet long, in which palm oil is stored, the capacity being 100 casks of palm oil.

The trade of the Pope Tin Plate Company is mostly with the canning and meat packing interests, and for this reason practically the entire output is bright plate. The capacity is about 50,000 boxes of bright plate per month. The company take their name from the president, Charles E. Pope, and their main offices are at 421 Wood street, Pittsburgh.

An Efficiency Test of Curtis Turbines.

The Curtis turbines in the power station of the Old Colony Street Railway Company at Newport, R. I., were recently tested under the supervision of Geo. H. Barrus of Boston, Mass., to determine whether or not they fulfilled the maker's guarantee, and also to compare their performance when using saturated and superheated steam. The following are the results as taken from the *Providence Journal* of May 2:

The consumption of dry steam per kilowatt hour was at full load 19.78 pounds, or 1 per cent. less than the guarantee of 20 pounds; at half load 21.38 pounds, or 7 per cent. less than the guarantee of 23 pounds. These results compare respectively to 14.76 pounds and 15.95 pounds per electrical horse-power per hour.

The variation of speed from no load to full load was 15 revolutions per minute, or eight-tenths of 1 per cent., which is 1.2 per cent. better than the guarantee of 2 per cent., the normal speed at full load being 1845 revolutions per minute. The momentary variation of speed at full load was 30 revolutions per minute, or 1.6 per cent., and when carrying the variable commercial load of the station it did not exceed 40 revolutions per minute, or 2.1 per cent. With the field current constant and the speed 1815 revolutions per minute, the voltage fell from 2480 at no load to 2232 volts at full load, a 10 per cent. reduction, which is the exact limit specified in the guarantee.

The rise in temperature after a run of eight hours with a load of 660 kw. was 38 degrees C. above the temperature of the room, 2 degrees better than the guarantee, and after two hours' run with a load of 764 kw. the rise was also 38 degrees C. above the room temperature, as against 55 degrees allowed by the guarantee.

At 50 per cent. overload the steam consumption was 20.22 pounds per kilowatt hour; at three-quarter load, 20.69 pounds; at one-quarter load, 27.85 pounds, and with no load save the condenser auxiliaries the consumption was 1408 pounds per hour, or 14 per cent. of that consumed at full load. With the variable commercial load of the station, which ranged from 333 kw. to 114 kw. and averaged 253.2 kw., the steam consumption was 22.38 pounds of dry steam per kilowatt hour. When the commercial load was augmented by a constant rheostat load, bringing the average up to 421.9 kw., the consumption of dry steam was 20.7 pounds per kilowatt hour.

With a superheating of 150.5 degrees at the throttle valve and 175.2 degrees at the superheater the steam consumption at full load was 17.79 pounds per kilowatt hour, which is 10.1 per cent. less than the 19.78 pounds consumed with dry saturated steam. When the superheating was increased to 289.6 degrees at the throttle valve and 334.4 degrees at the superheater the steam consumption at full load was 15.1 pounds per kilowatt hour, which is 19.6 per cent. less than the consumption of dry saturated steam.

Assuming all three turbines to be running at full load, which is about the rated capacity of the superheater, the coal economy as deduced from the results of the tests was seven-tenths of 1 per cent. when the steam was superheated 150.5 degrees at the throttle valve and 4.4 per cent. when it was superheated 289.6 degrees. With a load of 542.6 kw. on a single turbine, the superheater being used for that alone, there was a loss of coal due to a superheating of 160 degrees amounting to 2.7 per cent. Considering that the present load of the station is only about one-half of the capacity of one turbine, and that the future load is not likely to reach an average of two fully loaded turbines (one of the present installation being kept in reserve for emergencies), it appears to be doubtful whether or not the superheater can effect much saving of coal in the practical operation of the station.

When one of the turbines, carrying the commercial load of the station, which averaged 253.2 kw., or about half load, was operated independently with one of the boilers, the boiler being fed through the economizer by one of the steam pumps of the station, taking steam from the same boiler, the superheater being out of service, the total consumption of dry coal for all purposes on a 15-hour run amounted to 2.5 pounds per kilowatt hour, and the cost of this coal at \$4.05 per ton of 2240 pounds was 47-100 cent per kilowatt hour.

On a 24-hour evaporative test of three boilers, made under working conditions with Cumberland coal, the evaporation per pound of dry coal was 10.37 pounds of water from and at 212 degrees, the boilers working at an average of about one-half of their rated capacity. On a similar test, using a mixture of one part wharf screenings from anthracite coal and 3.4 parts Cumberland coal, the former costing 75 cents per ton and the latter \$4.05 per ton, the cost of fuel used for the day's run was 14.8 per cent. less than that of clear Cumberland coal.

The Valley Steel Plant Project Revived.—For some years the independent merchant blast furnaces in the Mahoning Valley have had under consideration the matter of erecting either a Bessemer or an open hearth steel plant to use up their surplus metal. Nothing definite has been done, but recently some discussion has taken place among the principal furnace owners as to its advisability, and it is not improbable that at some time in the near future this project may assume tangible form. The report that Robert Bentley, secretary and general manager of Mary furnace of the Ohio Iron & Steel Company, Lowellville, would be placed in charge of the plant is erroneous, being wholly premature. Plans for a plant have not developed far enough yet to talk about a manager. The entire matter is in an embryonic state and nothing may come of it.

The Musconetcong Iron Works have had in operation for several months at their blast furnace located in Stanhope, N. J., a set of improved fire-brick stoves and an equalizer. The stoves are of the two-pass type, 70 feet high by 19 feet in diameter, and each stove is provided with an external combustion chamber and also with two chimney valves. The work of the equalizer has been very satisfactory in maintaining a uniform temperature of blast. These stoves were designed by John M. Hartman and John S. Kennedy and were erected by the latter.

The Abendroth & Root Mfg. Company, Newburgh, New York, manufacturers of water tube boilers, spiral riveted pipe, exhaust heads and other specialties, have opened an office in Room 717, Fitzsimons Building, Pittsburgh, with Edward S. Grace in charge.

Advantages of Rope Transmission in Textile Plants.*

If there is one place above all others where rope driving predominates over either belt drives or electricity, it is in textile plants, and especially in the modern cotton mill.

Electricity as a means of transmitting power for extreme distances and in scattered plants, particularly in mills where all the machinery is not in operation continually, possesses advantages paramount to all other methods. But in well balanced cotton mills, such as our engineers are designing to-day, where the pickers are so numbered as to keep the cards in operation, they in their turn to supply the spindles, and finally the spindles to produce just sufficient yarn to keep all looms at work, electrical transmission has not yet reached a sufficient stage of perfection nor economy in installation to justify its adoption.

Economy, therefore, is the chief advantage of a rope drive over electrical transmission, but when compared with belt transmission there are a dozen or more points in favor of ropes. Those which apply particularly to textile plants may be summed up as follows:

The Distance and Direction in Which Power May Be Transmitted Are Practically Unlimited.—There are many rope drives now in successful operation where power is carried with economy a distance of from 200 to 500 feet. Where shafts are neither in the same line or plane, by properly placing guide sheaves power may be transmitted by ropes around corners, from one building to another, and, in short, between any two shafts, no matter how situated.

Economy of Space.—The width of rim surface required for rope sheaves is from one-half to two-thirds that of the width necessary for belting, according to the size of rope used. The supporting bearings may, therefore, be placed much closer for a rope than for a belt drive, an advantage that the practical mill man will recognize as of prime importance.

Rope Drives Are Noiseless.—This fact is due to the flexibility and lubrication of the rope, and to the air passage under it in the groove. There are many cotton mills in this country whose engines are developing from 1000 to 2000 horse-power, where the faintest sound in the engine room can be distinctly heard; therefore, the slightest irregularity or disarrangement in the running of any part of the engine can be detected at once.

No Electrical Disturbance is Produced.—It seems hardly necessary to explain to cotton spinners what a favorable point this is for rope driving, as the electricity generated by belts has always been one of the most serious troubles in textile manufacture.

No Lost Power from Slipping.—Where the diameter of the rope sheaves is sufficiently large, and the angle of the groove properly turned, so that an air space is left under the rope, it wedges so firmly in the groove that loss of power by slipping becomes a factor too insignificant to be considered.

Transmitting Power to Different Floors.—As power in all modern cotton mills is transmitted to three or more floors, the advantages of rope driving for such plants are undeniable. The full number of ropes start from the driving sheave, while the number required for each different shaft are easily taken off at the several floors.

Economy in First Cost and Maintenance.—In drives of 200 horse-power and up, where shafts are more than 30 feet centers, the cost of rope drives, as compared with belt or electricity, is much in favor of the former. The advantage increases rapidly as the distance apart of shafts and the amount of power increase.

To arrive at an approximate cost of the maintenance of rope drives is a difficult matter, as it depends almost entirely upon the manner in which the rope is spliced upon the sheaves, and, where a good transmission rope is used, upon the ability of the man in charge to let the ropes take care of themselves and to refrain from coating them with all sorts of injurious preparations. The

average life of rope on the main drive of a cotton mill, where the multiple or English system is used, is from eight to ten years, during which time the entire cost of maintenance should be confined to the labor required to take up the slack in the ropes once, or at the most twice.

When estimating the maintenance cost of an electric drive it is well to bear in mind that the equipment installed to-day is almost sure to be antiquated six or seven years hence. There are cases on record where mills were refused insurance until electrical apparatus, put in but five years previously, had been replaced by appliances of later date.

To make a comparison of the first cost of the three forms of transmission, we will take for example a three-story mill developing 1000 horse-power. The engine wheel is 21 feet in diameter, 70 revolutions per minute. The three driven sheaves are each 64 inches in diameter; 400 horse-power is taken off at the third or spinning floor, 400 horse-power at the second or carding floor, and 200 horse-power at the first or weaving room. Nine 1½-inch ropes are carried to the two upper shafts, and five ropes to the lower, as against two 40 inch and one 20 inch double belts.

If this arrangement may be criticised on the score that the belts are wider than strict necessity requires, it must also be admitted that the amount of work allotted to the ropes is equally conservative, for each rope is doing a little less than 44 horse-power, whereas the printed tables of some of the most prominent manufacturers of rope driving machinery give 65 horse-power as the amount of work to allow for a 1½-inch rope running at 5000 feet per minute. In making this comparison the writer has endeavored to follow as nearly as possible the methods used by successful mills of recent design.

For the rope and belt drive above described we have the following table of costs, due allowance having been made for material wasted in splicing in both cases. The prices for both rope sheaves and belt pulleys were quoted by one of the largest machinery manufacturers of this country.

Relative Cost, 1000 Horse-Power, Belt and Rope Drive.

Rope sheaves.	Belt pulleys.	Trans-			
Driver	Driver	mission			
21 feet diameter.	21 feet diameter.	1½ inches rope.	Leather belts.	Total cost of rope drive.	Total cost of belt drive.
23 grooves.	21 feet diameter.	3 pulleys.	2 ply.		
3 shares	64 inches diameter.	64 inches diameter.			
\$4,400	\$4,050	\$541.48	\$1,949.14	\$4,941.48	\$5,999.14

Width of rim for ropes, 58 inches; for belts, 102 inches.

The effort to determine the cost of an electrical transmission for the above mill has not been entirely satisfactory to the writer, for each concern applied to for figures has recommended different arrangements for the motors—some advocating that the power be divided into units at many points, necessitating the use of a large number of small motors. But the cheapest arrangement that will meet requirements satisfactorily seems to be to place two 200 horse-power motors on the second and third floors, with two 100 horse-power motors on the weaving floor. These six motors, together with a 750-kw. generator, switch board and other necessary appliances, amount to a total of \$25,400. It would hardly seem necessary to go beyond these figures to prove the advantage of rope drives over either belt or electricity at the present time.

As an example of the flexibility of rope driving with the continuous system, a drive was recently installed in a woolen mill where the distance between centers is but 16 feet, it being impossible to procure more room in the building. And in this short space, a quarter turn drive is transmitting 200 horse-power from a vertical water wheel running 205 revolutions per minute to the horizontal shaft of an electric generator with a velocity of 579 revolutions per minute. The actual distance between the circumferences of the driving and driven sheaves is but 10 feet in the clear. Furthermore, the old rule that the smallest sheave must not be less than 40 times the diameter of the rope has been violated, for, in order to procure the required number of revolutions at the driven shaft, its sheaves could not be more than 34 inches in diameter. On this drive, ten 1½-inch ropes are running

* Abstract of a paper read by Frederick S. Greene, New York City, before the New England Cotton Manufacturers' Association.

at a speed of 5150 feet per minute. In spite of these disadvantages this rope drive has been in successful operation for many months. It is probably the shortest quarter turn drive ever erected, and is a striking example of the flexibility and advantages of rope drives in solving difficult problems in the transmission of power.

Nitrogen in Iron and Steel.

BY ERNST A. SJÖSTEDT, SAULT STE. MARIE, ONT.

During the last decade it has been shown that nitrogen can enter into combination with iron during the different processes of manufacture, and that, although generally present only in minute quantities (0.002 to 0.02 per cent.) in iron and steel, its effect on the metal is very detrimental, it even being claimed that "it is as impossible to produce a good iron or steel with high nitrogen as with a high phosphorus contents," and that 0.006 is a maximum nitrogen percentage in a good steel. A pig iron, although free from all the impurities and detrimental elements generally looked for, but containing any perceptible amount of nitrogen, will produce an inferior (red or "yellow" short) iron and steel; and as its nature and tendency of uniting with the nitrogen are not generally well known, a *résumé* of two recent articles in *Teknisk Tidskrift* (Dept. K. & B., February, 1904), written by Hj. Braune and Clas Bolin, on "Nitrogen in Pig Iron" and "Cyanogen Formation in the Blast Furnace," should be of interest to the furnace manager.

It has long been known that cyanides are formed during the blast furnace process, and that potassium and sodium compounds are formed above the tuyeres of every blast furnace was pointed out in 1845 by Bunsen and Playfair. The greatest part of these cyanogen compounds are decomposed in the upper part of the furnace, thereby facilitating the reduction of the ore. Part of them, however, escape undecomposed with the furnace gases, together with other particles of solid material, accumulating in the gas flues as flue dust. The formation of potassium cyanide, according to Braune, depends on the following three conditions:

1. The furnace temperature.
2. The composition of the slag.
3. The character of the fuel.

That the temperature should be of prime importance is evident, as without a sufficiently high heat in the furnace the chemical combination between carbon and nitrogen will take place; consequently, a cold furnace prevents the formation of potassium cyanide, while a hot

lime charge, so as to form a monosilicate slag, a pig iron with 0.024 per cent. of nitrogen was obtained, the temperature of the furnace meanwhile being kept practically the same. As a consequence it follows that with an acid slag a higher furnace temperature is permissible without any perceptible amount of potassium cyanide being formed, while with a high temperature and basic slag a high nitrogen percentage is to be expected. As to the fuel, Braune is under the impression that only pig iron made from charcoal contains any large amount of nitrogen, owing to the larger amount of potassium present in the charcoal, but Bolin states that while the investigations of Särnström and Akerman proved the average alkali contents of the charcoal to be 0.16 per cent., he himself has tested coke from Ostran, used in the Donawitz blast furnaces, and found it to contain about 0.14 per cent. K_2O and 0.25 per cent. Na_2O , and points out that 1 part of K_2O corresponds to about 0.55 p. cyanogen, while 1 p. Na_2O corresponds to 0.84 p. cyanogen, and claims that not only the potassium present, but sodium as well, predisposes to the formation of cyanogen, and that the alkali contents of the coke thus being equal to that of the charcoal, the presence of nitrogen in the coke iron is as likely as in the charcoal iron.

The danger of the cyanogen compounds in the blast furnace in the production of a good pig iron for any purpose being conceded, it is therefore necessary either to prevent this formation or to neutralize its influence on the iron. As a means for the prevention of the formation of alkali cyanide compounds Braune gives the following directions for the blast furnace construction and operation:

A blast furnace intended exclusively for the manufacture of a Lancashire pig (as low as possible in Si, Mn, S and P) should be low and with large bosh (about 47 x 10 feet), the diameter at the tuyeres small (5 feet) and the bosh flat, the hearth and bosh walls thick (3 to 4 feet), and the top wall of the furnace cool and thin, the tuyeres nonprojecting and open, and should have an open top. When operating, the slag should be kept neutral or slightly acid, the temperature and the pressure of the blast low, as also the general furnace temperature and the driving. Under such conditions, with a "smelting intensity" of 9 and a "relative driving"† of 1, the daily capacity of the furnace from a 50 per cent. charge would be, say, 15 tons; and if a larger output be desired, Professor Wiborgh has suggested an oval hearth area with the larger diameter twice the distance between the parallel walls (2 x 1.5 m.), and thus enabling the low blast pressure to reach the center, while increasing the area at the tuyeres to 4.01 sq. m., and the daily capacity of the furnace to $4.01 \times 9 = 36.09$, say, 35 tons. For a 25-ton output the difference between the transverse and conjugate axes need only be made correspondingly smaller, always retaining the same width (1.5 m. = 5 feet).

A blast furnace for the manufacture of a Bessemer pig should be high, have a large hearth area (the diameter of the soft wood charcoal furnace to be about 1.8 m. = 6 feet, and that of the hard wood charcoal furnace 1.95 m. = 6 feet 6 inches), straight bosh lines, thin furnace lining, water cooling, projecting tuyeres, and closed tuyeres and top; and it should be run on a basic mixture and with a smelting intensity of 20 to 30. The daily capacity of such a furnace would, therefore, be between 50 and 90 tons. For a further increase in the production an oval shaped hearth area is also here advised, and attention is directed to the design by W. Vaughan of Johnstown, Pa., proposing dimensions of 20 x 12 feet = 205 square feet hearth area.

In a cold working furnace with low blast temperature and acid slag no appreciable amount of nitrogen is thus taken up by the iron, and if the conditions are such that alkali cyanides are formed, the combination between nitrogen and the iron can be prevented by a heavy furnace charge, when the iron and the carbon will combine above the tuyeres, or it is caused to be saturated with phosphorus, instead of carbon (2.75 to 3 per cent. P

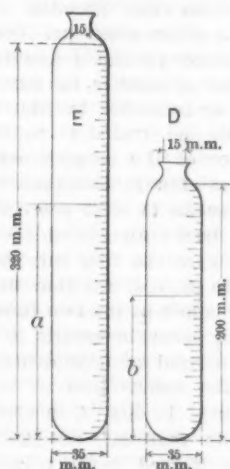


Fig. 1.

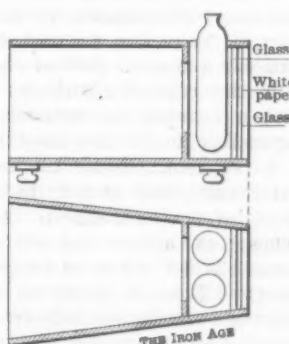


Fig. 2.

working furnace and fast driving will tend to increase the amount of the same. This amount is also dependent on the composition of the slag, inasmuch as the more basic this is the more nitrogen will be taken up by the pig iron. For instance, a furnace running on a trisilicate slag produced a pig with 0.002 to 0.003 per cent. of nitrogen, while a bisilicate mixture produced an iron with 0.016 per cent. nitrogen, and by further increasing the

* Number of tons pig iron per square meter area obtained from a 50 per cent. charge.

† Number of furnace fillings in 24 hours.

present preventing the nitrogen from combining with the iron), or a titaniferous ore is added to the charge, when the nitrogen present will combine with the reduced titanium to titanium nitride, which goes in the slag.

Analytical Methods.

1. The method for determining cyanogen and its compounds (CNS, OCN, CNCl) in the above mentioned flue dust not being generally known, Bolin's method is hereby given: To 2 gr. of the carefully dried sample add cold water while stirring, filter off the insoluble and wash. Add to the solution, containing the alkali salts of said radicals, a solution of AgNO_3 in excess, and leave in dark room until the salts are precipitated as corresponding Ag compounds. When the precipitation is complete and the precipitate has settled so as to leave a clear solution above (which generally takes place within six hours, or less if the solution be slightly heated), it is filtered off and carefully washed with water. Place a clean beaker under the funnel and wash with dilute nitric acid (equal volumes of H_2O and HNO_3 of sp. gr. 1.2), repeating this until all the AgOCN present has dissolved ($\text{AgOCN} + \text{HNO}_3 + \text{H}_2\text{O} = \text{AgNO}_3 + \text{H}_2\text{N} + \text{CO}_2$), while all the other Ag salts remain undissolved. Precipitate the Ag in solution with HCl to AgCl , which weigh on a weighed filter, or fuse in a porcelain crucible, and calculate the corresponding amount of OCN. To the remaining contents on the filter add warm H_2N , and repeat until the AgCN is dissolved. Ag_2S remains on the filter, and after having been washed and dissolved in concentrated HNO_3 , the Ag is precipitated by HCl , and the S contents are calculated according to the amount of AgCl obtained. The filtrate, containing AgCl , AgCN and AgSCN , is diluted to 100 cc and divided into two equal parts, *a* and *b*. To part *a* is added HNO_3 until the silver salts again are precipitated, when they are taken up on weighed filter, washed with water to which has been added a little nitric acid, dried at 100 degrees C. and weighed. The filter with contents is now transferred to a beaker and boiled with fuming nitric acid (when the S in the AgSCN will oxidize to SO_3), HCl is added until all the Ag is precipitated, after which the precipitate is filtered off and the total Ag contents used for checking off, as indicated below. The S in the solution is determined in the usual manner by means of BaCl_2 , and from the amount of BaSO_4 obtained the percentage of AgSCN is calculated. To part *b* is also added HNO_3 until the Ag salts are precipitated, after which a few cc concentrated H_2SO_4 are added, and the solution evaporated until the H_2SO_4 fumes, when the AgSCN and AgCN are dissolved, but not the AgCl . The beaker is allowed to cool, after which the solution is diluted with water and the AgCl filtered off and determined. The amount of AgCN is the difference between the total of $\text{AgCN} + \text{AgSCN} + \text{AgCl}$ and the sum of AgSCN (all obtained from the *a* solution) and the AgCl obtained from the *b* solution; and from the now determined amounts of AgSCN , AgCl and AgCN the corresponding radicals are estimated (not forgetting that solutions *a* and *b* each represent only half of the sample).

For checking off the value of the total Ag contents obtained from solution *a* the following calculations are made, where *x*, *y* and *z* are the respective equivalents of AgCl , AgCN and AgSCN , *A* the obtained total weight of said Ag salts, and *O* the total amount of Ag obtained:

$$143.1x + 133.7y + 165.7z = A \dots\dots\dots (1)$$

$$\text{AgSCN} = B = 165.7z, \text{ or } z = B : 165.7 \dots\dots\dots (2)$$

$$143.1x + 133.7y = A - B \dots\dots\dots (3)$$

$$107.7(x + y + z) = O, \text{ or}$$

$$107.7x + 107.7y = O - 107.7/165.7B \dots\dots\dots (4)$$

x and *y* are now obtained from (3) and (4), and the amount of $\text{AgCl} = 143.1x$, and $\text{AgCN} = 133.7y$.

To find if compounds of ferrous and ferric cyanogen be present in the flue dust, qualitative tests are first made, and, if present, the Ag salts and Ag_2S remain undissolved when treated with H_2N . It is, therefore, necessary to dissolve the Ag_2S with boiling HNO_3 (sp. gr. 1.2), after which the iron-silver cyanogen salts are dissolved in concentrated H_2SO_4 , and the Ag and Fe contents determined and the cyanogen compounds calculated as above.

2. The method described by Braune for the determination of nitrogen in iron and steel is based on the property of the so-called Nessler reagent (iodide of po-

tassium and mercury salt of formula KI_2HgI dissolved in potassium hydrate, which is a clear and colorless liquid) to change into a deep yellow on adding even the smallest amount of ammonia or ammonium salts, the N uniting with the said Nessler reagent under formation of a mercuriooxide-ammoniumiodide salt ($2\text{KI}_2\text{HgI} + 3\text{KOH} + \text{H}_2\text{N} = \text{Hg}_2\text{O}_2\text{H}_2\text{NI} + 5\text{KI} + 2\text{H}_2\text{O}$). In using this method the nitrogen in the iron is converted into HN compounds by the iron being dissolved in HCl , forming NH_4Cl , and the removal of the ammonia by the addition of a strong base. Owing to the small amount of the H_2N , it can easily be separated, by distillation, from the reagents and absorbed by the distilled water. The N contents are thereupon determined by the color produced on adding the Nessler reagent. The method is worked out for the very small N contents usually present in iron and steel—namely, from 0.024 to 0.004 per cent.; and in the event of a higher percentage of N half of the quantity of the sample should be used, while double the amount should be taken if the N contents be below 0.004 per cent. The apparatus used consists of an Erlenmeyer flask of 1500 cc capacity, with rubber stopper, funnel tube and exit tube for the evolved gases, connected with a condensing tube placed sufficiently high so as to accommodate a 160 cc cylinder under its lowest end. In this flask are placed 250 cc water and 20 cc caustic soda, of a strength equal to its own volume HCl of 1.124—i.e., equal volumes of KOH and HCl , neutralizing one another, this being tested by litmus paper. (Care must be taken that the rubber stopper does not come in contact with the caustic soda, as a brown colored solution then is obtained, giving only a faint N reaction, and the stop cock should be lubricated with vaseline to prevent its sticking). Distill until the distillate gives no reaction with the Nessler reagent. Meanwhile 1 gr. of the sample is dissolved in 10 cc warm HCl free from N. When the iron has dissolved, filter off the C, &c., and transfer the filtrate to the bulb of the funnel tube, allowing it to run down, drop by drop, into the boiling caustic soda solution in the flask. The burner flame is now turned low, so that the gas evolution, on adding the ferric chloride, will not be too violent, but is again increased for hastening the distillation. Usually all the ammonia is transferred to the distillate in the cylinder when about 100 cc solution has been obtained, but tests on a few cc of the distillate should be made with a drop of the reagent earlier, as for low N contents hardly 50 cc are required. Put 2 cc of the Nessler reagent in a graduate, dilute it with distilled water to 10 cc and add this, while stirring, to the distillate in the cylinder, when a yellow color will appear, according to the intensity of which the amount of N is at once roughly estimated, after some practice. The exact N contents is determined in the following manner: Take two graduated tubes of exactly the same diameter (35 mm.) and of shape as indicated by Fig. 1. Pour the colored distillate in E and transfer to D, with a burette, the number of cc of the solution corresponding to the assumed N contents in thousandths of 1 per cent.; dilute the solution in D with distilled water until tube is a little over half full, and color it with the Nessler reagent. After three to four minutes compare the colors, and add to the darkest solution sufficient distilled water to make the colors in the two tubes exactly alike. In order to obtain accurate results several tests should be made on the normal solution diluted to different strengths, and for the comparison of the color shades a camera, as illustrated in Fig. 2, is used. The lighter colors being easier to read off, not more than 12 cc normal solution is transferred to the normal tube, but with higher N contents the distillate may have to be diluted more, hence the larger size of tube E. Like colors of the solution premising like quantities of coloring matter, the N contents in the sample is equal to $a : b$, where *a* is the volume units of the solution in tube E, *b* the number of units in tube D, and *n* number cc of the normal solution used. When using 1 gr. of the sample, each cc normal solution corresponds to 0.001 per cent. N in the iron, and the test may be considered correct within 0.0005 per cent. The time required is usually an hour, but by putting hot water into

the Erlenmeyer flask 45 minutes will suffice for the test. After each test the apparatus should be carefully cleaned, especially the Erlenmeyer flask, on the bottom of which the ferrous hydrate is apt to stick and cause it to break.

The reagents must be free from N (or of known N contents), and the following two solutions must be made by the chemist:

(a) Standard ammonia solution: Chloride of ammonia in distilled water of a strength corresponding to 0.001 mg. N per cc solution = 0.038147 gr. sal ammoniac in 1 liter of water. The solution is carefully prepared by first making a solution four times stronger than required, of which one-quarter is taken and diluted four times its own volume. The ammonium chloride must be carefully dried before weighing, the water should be twice distilled and carefully tested for N, and the standard solution kept in a flask with well fitting glass stopper.

(b) Nessler reagent: 50 gr. potassium iodide are dissolved in 50 cc of warm distilled water, and, while dissolving and continually stirring, add by degrees a concentrated solution of mercury bichloride, when the colorless and solvent Nessler salt (K_2HgI_4) is formed, and later on, after some 20 to 25 gr. mercury chloride have been used, a red precipitate, HgI_2 , is formed. Filter off the precipitate, add to the filtrate 150 gr. caustic soda dissolved in 300 cc water, and dilute to 1 liter. Add to this 5 cc of a saturated solution of mercury bichloride. shake and mix thoroughly, when a grayish yellow precipitate of Nessler salt and mercury bichloride is formed, which is allowed to settle during a couple of days, after which the clear solution is decanted or siphoned off into a glass stoppered bottle.

British Iron Trade Notes.

The Markets.

LONDON, April 23, 1904.—There is but little to add to my comments last week upon the present position of the market. The absence of both America and Germany has made it easy for British steel makers to obtain a number of good orders, and they are now more fully occupied than for some months past. The stronger position of the steel market naturally strengthens pig iron, some makers of which are now so well sold that they have no further iron left for immediate delivery. As a general rule contracts are heavier than they have been for some time, and in every way quotations are firmer. In regard to finished iron the outlook is brighter. In the galvanizing trade some little sensation occurred owing to the announcement of the appointment of a receiver in the works of a well known Staffordshire firm. The works are being carried on and it is thought that after the payment of the debenture holders there will be a substantial surplus for the shareholders. The shipbuilding industry still continues in a good way, and it is calculated that since the turn of the year about 160 steamers have been ordered, the majority to be of large cargo-carrying capacity.

The prices named by British, German and American makers of locomotives, in connection with recent tenders, are interesting as affording a basis of comparison. The British price is lowest, £4100; then comes the German, £4613, followed by the United States price of £5200. It is true that the state of activity in the works influences the amount of tenders, for a firm with their order book full are not so likely to take any risks in the way of possible profit as one having little work on hand; but it is believed that the three instances quoted have not been greatly influenced by this consideration.

Trade Unionism and Legislation.

Last night, in the House of Commons, the Trade Unions and Trade Disputes bill passed its second reading by a majority of 39. The real gist of this bill is to put trade unions in the legal position they held prior to the celebrated Taff Vale decision. The bill also seeks to define picketing, and to legalize certain forms of it. Rightly to understand the immediate bearings of the question, it may be well to explain the present legal position. There are two main grievances resulting from judicial exposition of which trade unionists complain. They are, first,

that the funds of trade unions are responsible in damages for any injury sustained by a third party, usually an employer, which may be the result of the wrongful act of an agent of a trade union while acting, or purporting to act, in the interest of such union; and, second, that workmen, whether agents of a trade union or otherwise, may not "watch or beset" any place where a workman or intending workman "happens to be," with the object of persuading any such person to legally determine a contract of service or not to enter upon a contract of service. In other words, "picketing" is held to be an actionable wrong unless it be strictly confined to the obtaining and communicating information.

The first mentioned grievance was consequent upon the decision of the House of Lords in the well-known Taff Vale case, which established that a trade union in its collective or corporate capacity is responsible for wrongful acts done by its agents while acting, or purporting to act, in its interest, though it did not expressly authorize such acts and might be ignorant they were committed. It would, of course, be impossible to reverse the fundamental doctrine of the law of agency, of which this decision was only the expression, by an enactment of general application; the true question for consideration is whether or not the circumstances and conditions of a trade union are so peculiar as to warrant exceptional treatment.

The second grievance relates to "picketing." The act of 1875 (conspiracy and protection of property) relieved from criminal liability a person who in furtherance of a trade dispute attended at or near a "place" merely for the purpose of obtaining or communicating information, but made it a criminal offense for any one to "watch" or "beset" a place "with a view to compel any person to do or abstain from doing anything which he had a legal right to do." Until recent decisions were given, trade unionists have acted on the assumption that it was not an actionable wrong to station men in a public place, peaceably to persuade persons not to enter upon a contract of employment, or to advise workmen by legal notice to determine a contract of employment. The courts have, however, taken a different view; in a recent case a chancery judge held that the attendance of a "picket" at a public landing stage to advise men arriving by boat not to enter into a contract of employment with a local manufacturer was "watching and besetting," and, not being merely for the purpose of "obtaining or communicating information," was actionable at the instance of the local manufacturer.

Although the bill has secured a second reading, the Government is not friendly to it, and the belief is strong that it will be smothered. Still, the fact that a majority of the House of Commons in present circumstances should be prepared to go back to the *status quo ante* Taff Vale is a sign of the times.

S. G. H.

Western Natural Gas Pipe Lines.—A press dispatch from Chanute, Kan., dated April 30, states that a pipe line will be laid from that point to St. Louis, Kansas City and St. Joseph to convey natural gas. The plans are made, the money is available and the wells are already drilled. The company will start with more than 100 wells and a daily capacity of 300,000,000 cubic feet of gas, which is but little less than the present daily consumption of the United States. The line from Chanute to Kansas City will be laid first, the distance being more than 110 miles. The line to St. Louis will come after and will be more than 200 miles long, or as long as the longest gas pipe line ever built. The company who own the wells and who will build the pipe line are composed largely of those who own the Union Natural Gas Corporation of Pittsburgh, one of the largest producers of gas in the Eastern fields. The report that the Standard Oil Company have any interest in the project is said by the promoters to be erroneous. The capital was all raised in Pittsburgh, Kansas City and St. Louis.

The blooming mill at the South Works of the Carnegie Steel Company, at South Sharon, Pa., turned out last month over 24,000 tons of billets, the largest record for any one month in the history of this plant.

The Iron Age

New York, Thursday, May 5, 1904.

DAVID WILLIAMS COMPANY,	- - - - -	PUBLISHERS.
CHARLES KIRCHHOFF,	- - - - -	EDITOR.
GEO. W. COPE,	- - - - -	ASSOCIATE EDITOR.
RICHARD R. WILLIAMS,	- - - - -	HARDWARE EDITOR.

The Iron Age at the World's Fair.

A few days before the opening of the Louisiana Purchase Exposition there was completed the installation of the exhibit of the David Williams Company, publishers of *The Iron Age*, *The Metal Worker* and *Carpentry and Building*. The exhibit is located in Section 72 in the Palace of Mines and Metallurgy, at the southwestern entrance of the building. A conspicuous landmark in its immediate vicinity is the huge statue of Vulcan, which is the crowning feature of the mineral and metallurgical exhibit of Alabama.

We invite our friends to avail themselves of the facilities which we have provided. There will be an attendant at the exhibit at all times who will be glad to be of service. Files and current issues of the publications of the David Williams Company will be at the disposal of visitors, and arrangements are perfected for handling mail and for extending any courtesies to the friends of *The Iron Age*.

The Iron Age Directory for 1904.

The eighth annual edition of THE IRON AGE DIRECTORY has been printed, and every subscriber to *The Iron Age* will shortly receive a copy. Its completion thus early is an achievement editorially and mechanically. For the benefit of new subscribers, who are not familiar with the character of the Directory, it may be well to state that it furnishes a classified list of the great variety of products of the 1373 concerns who were regular advertisers in *The Iron Age* April 1. This list of products is not confined to the things specifically named in the advertisements, which often constitute but a small part of an advertiser's output, but it is intended to cover every separate product or article turned out by all the advertisers. The preparation of such a list has therefore been a task of no little magnitude and has involved a heavy outlay. It was necessary to correspond with every advertiser for the purpose of getting a complete list of his products, and these have been carefully arranged in alphabetical order. Cross references have been freely used to enable a desired article or product to be speedily found. Under each heading, a list of the manufacturers of that particular product is given, also arranged in alphabetical order.

The wide scope of the Directory is shown in the fact that the headings comprise a grand total of 5531. The articles or products thus named cover practically everything made in the iron, metal, hardware and machinery trades, as well as a great many articles outside of these lines. The book will thus be found of very great value to railroad purchasing agents, buying departments of large manufacturing establishments, merchants, and, in short, everybody consuming or handling the products represented in the important lines whose interests are served by *The Iron Age*. It is almost unnecessary to say that its contents derive additional value from the fact that the manufacturers who advertise in *The Iron Age*, and whose products are therefore listed in the Directory, include in nearly every instance the leaders in their lines. The book is of convenient size for desk or pocket use, and is substantially bound in a stiff muslin cover.

The Principle of the Sliding Scale Minimum.

Everything depends upon the point of view. It has been the custom from time immemorial for the representatives of the Amalgamated Association of Iron, Steel and Tin Workers to insist upon a high minimum on their wage scales. Last month they worked for a reduced minimum on the sheet and tin plate scales. This is such a remarkable occurrence that it calls for comment. In the past many wage schedules which were intended to be sliding scales, and which were with great formality signed by representatives of manufacturers and of the Amalgamated Association as sliding scales, were absolutely divested of any disposition to slide by the very high minimum fixed for the base. It was almost invariably necessary to accept such "sliding" scales or the Amalgamated representatives would refuse to sign, and in the old days that meant trouble for an indefinite period. The sliding scale on bar iron, for instance, stood for years with its minimum far above the market price of bars. Hence, the price of bar iron might fluctuate considerably from one month to another, now giving a manufacturer a little profit on his investment and then making him feel like calling a meeting of his creditors; but the wages of his Amalgamated employees went on inflexibly, heeding naught of price fluctuations because they were protected by the high minimum. It was usually so high that it required a boom in the iron trade to reach it.

It is naturally to be supposed that the Amalgamated officials arrogated credit to themselves for the maintenance of the principle of a high minimum. While manufacturers were hugging the delusion that they had secured an arrangement which might some time work in their favor, but only did so in the recession from a boom, the Amalgamated officials could point to the high minimum as providing a bulwark against anything like a serious reduction in wages. In times of great stress mills might close because owners could see no chance of getting a margin over cost, figuring on Amalgamated rates for labor, and if they tried to start up they could get no concession. The minimum had been fixed and it could be driven no lower. It is, therefore, quite interesting to note the change of front made by the officials of the same organization in the explanation which they now make regarding the recent wages settlement in the sheet and tin plate mills. They take much credit to themselves for the lowering of the card rate in the scales governing the wages in such mills. The minimum in those scales, as adopted last year, was so high that when business fell off last autumn, and prices were reduced, the manufacturers operating union mills were compelled to close them. They made overtures for a 20 per cent. reduction in the rate, and, as our readers know, a compromise was effected at 18 per cent. But it was then perceived by the representatives of the association that both sheet and tin plate market prices were so much below the minimum named in the sliding scale that business would have to improve very considerably to bring the scale into operation. Therefore they made a quick change of front, and perhaps for the first time in the history of the organization they advocated a reduction in the base rate, and it may safely be assumed that the manufacturers were perfectly willing to agree to such an arrangement. On this point the official statement of the Amalgamated Association says:

The lowering of the sheet scale to a 2.30-cent and the tin scale to \$3.40 card rates puts both trades in the very best position to share in any advance in price that the sheet and tin manufacturers may secure in selling their products in the future. While the delegates to the conference were by the force of circumstances impelled to meet the demands of the manufactur-

ers for a readjustment of wages, yet it must be said to their credit that they safeguarded the future of the trades by inducing the manufacturers to lower the card rate to a basis that is about equal to the present selling price of those commodities; hence, if the sheet and tin market should take an upward trend in prices, the workers are in a good position to participate in any boom that may come along.

The point of view after a reduction of the base rate, when it is found that the minimum is so high as to require a boom to overtake it, changes the aspect very considerably for the one who seeks some benefit from the terms of a sliding scale. Therefore, the point was well taken by the Amalgamated officials that the minimum should be brought down closer to the actual market price, and thus give market fluctuations a chance to have some effect upon the wages of the members. It is worthy of praise, and we hope the sagacity of the leaders may be rewarded ere long by an advance in wages through improving business conditions. But the principle of a high minimum for a sliding scale has been rather severely twisted.

The World's Fair an Epitome of Our Civilization.

In his address at the opening of the St. Louis World's Fair President D. R. Francis said: "So thoroughly does this exposition represent the world's civilization that, if all man's other work were by some unspeakable catastrophe blotted out, the records here established by the assembled nations would afford all necessary standards for the rebuilding of our entire civilization."

It is only necessary to move through the vast buildings and view the innumerable exhibits representing the achievements in every industry in every principal nation of the globe to become convinced that President Francis did not overstate the case. Other fairs have been great in extent and grand and beautiful in design, but the Louisiana Purchase Exposition, while the greatest in extent and second to none in artistic beauty, will live in memory as a "city of knowledge."

This educational feature did not come about by accident. It has been the guiding principle of the management from the first. In order to be able to control exhibits along educational lines, space was made free to exhibitors, and it was the man having something worth seeing, something of real educational value and interest, rather than the man with the long purse, who was given the best location and the largest space. A very large proportion of the exhibits are what are known as "live" exhibits. Processes rather than products are shown: machines are in operation doing useful work, and skilled artisans ply their handicrafts for the benefit of the visiting public.

Just as the Philadelphia Centennial Exposition of 1876 popularized the Corliss engine and gave the initial impetus to the telephone and the bicycle, so the St. Louis fair will popularize and introduce the steam turbine, the large unit gas engine, the automatic telephone, the wireless telegraph, and a score of other forces of civilization. The large attendance on opening day is full of promise for the popularity and success of the fair during the seven months of its life, and no one who spends even an hour within its gates can fail to go away without having gained a broader conception of the civilization of our times and the marvels of the works of men.

The strikes in the metal trades this spring are due to an unusual degree to trifling causes. The men who have been persuaded by their leaders to leave their work—and the number is surprisingly large considering the condition

of the labor market—seem to be struggling for benefits which are petty enough as compared with the losses which the strikes involve. From the standpoint of their obligations to those dependent upon them for support, the action of these strikes is unnatural and cruel. Take, for example, the strike at the works of the Fore River Ship & Engine Company, Quincy, Mass., where hundreds of men voluntarily left employment because a Saturday half holiday could not be extended to cover an additional month. The strike of the boiler makers of the New York, New Haven & Hartford Railroad is almost as foolish. The men submitted a considerable list of demands, including the much coveted nine-hour day. Everything was granted them—nine hours and better overtime wages—but the company could not see their way clear at this time to granting ten hours' pay for nine hours' work. The boiler makers of the Boston & Albany division of the New York Central, at Springfield, Mass., are striking because of the discharge, for cause, of two of their number. No one knows better than the workmen what the condition of the labor market is at the present time. They know that thousands of men in their own trades are out of work. Each must know that it will be difficult for him to get work in any shop excepting that which he has voluntarily left, because few concerns are hiring men at present, excepting as they are taking back their old employees. Two years ago, and even last year, the advantage was with the striking workman, because his services were in great demand. To-day it is different, as the workmen themselves know very well. Yet they pick out petty causes for quarrel with their employers. Whatever sympathy may ordinarily go out to men striking to obtain distinct benefits for themselves, for their craft and for their dependents can hardly be forthcoming for the strikers of 1904.

National Metal Trades Association Notes.

CINCINNATI, OHIO, May 2, 1904.—The brass manufacturers of Chicago have won their fight for the open shop. The St. Louis Metal Trades Association, of which J. W. Leigh is assistant secretary, is considering the question of local agreements.

The Committee on Agreements of the Chicago Metal Trades Association are holding daily sessions.

W. O. Bates of the Bates Machine Company, Joliet, Ill., is anxious to have an opportunity of expressing his opinion on the National Metal Trades Association to any manufacturer considering membership.

The attorneys employed by the commissioner are busily engaged in investigating the laws of the several States relative to the amendments on Article IX of the Constitution, action on which was taken at the recent convention.

There will be a general meeting of the Manufacturers' Association of Pittsburgh, of which George M. Cooper is the secretary, shortly after the middle of May, at the call of the president of the association.

The secretary visited St. Louis and Chicago the past week in the interest of the association.

From all reports being received it would appear that the time is opportune for the enforcing of the open shop plan of doing business.

The Administrative Council are arranging for a meeting at the commissioner's office for the latter part of the month.

The secretary of the Chicago Metal Trades Association announces the following summary for the week ending April 28: Total registration, 262; total calls for help wanted, 49; total men employed as reported, 26.

The Cincinnati Metal Trades Association will hold its annual meeting at 148 East Fourth street on Thursday evening, May 5. The election of officers and general routine business will be the order of the evening. At a recent meeting held by this association the following resolution was offered, and the secretary instructed to for-

ward a copy to members of the Legislature with the request that they use their influence to have it passed:

Resolved, That it is the sense of this meeting that the present law relating to conditional sales contracts, whereby the title does not pass to the purchaser until full payment has been made, should be amended to place manufacturers of machinery, engines, boilers, &c., on the same basis as manufacturers of railway supplies.

An Open Market on Lake Ores.

CLEVELAND, Ohio, May 3.—The Ore Association met here to-day and after a short session adjourned *sine die*. At the conclusion of the meeting an official announcement was issued. It seems that at the New York meeting the producing consumers of ore, who last year produced about four-sevenths of the ore represented in the association, favored a curtailment, but refused to accept a proportionate cut in their own output. They insisted upon producing what they would consume. The so-called merchant mines, which produced three-sevenths of last year's total, said that this was granting conditions under which no association could be formed this year.

The producing consumers, however, suggested that the merchant mines take the matter under advisement and see if any settlement could be made. As a result, the merchant mine owners came to Cleveland and held a meeting to-day. Their position on the question of output has not been changed in the least. They insist that the producing consumers shall accept a proportionate reduction in their output. At the New York meeting Bessemer Old Range was priced at not to exceed \$3.50 per ton, f.o.b. Lake Erie ports, non-Bessemer Old Range at \$2.85, Bessemer Mesaba at \$3.25 and non-Bessemer Mesaba at \$2.65 per ton. The basis of prices was satisfactory to all concerned, but the different interests split on the question of output.

At the meeting to-day it was shown that several million tons of ore of the Bessemer Mesaba grade have been tied up on contracts running from two to ten years. The prices range between \$2.75 and \$3, or considerably below the price which was tacitly agreed upon at the meeting in New York a week ago.

No Bessemer contracts have as yet been made, and it is likely that Bessemer Old Range transactions will be small, since merchant Bessemer furnaces expect light buying for the remainder of the season. A disposition is manifest to cut either the non-Bessemer Old Range or non-Bessemer Mesaba ore prices.

One of the members of the association at the conclusion of the meeting said that it need not be expected there will be any serious result from this failure to agree. The ore properties are in strong hands, who will not have to sell the output unless a good market can be found. This will result in curtailing the production and in preventing anything like a serious break in prices. The principal merchant ore mines are owned by such strong firms as the Cleveland Cliffs Iron Company, Oglebay, Norton & Co., Pickands, Mather & Co., and Corrigan, McKinney & Co. None of these firms is in such position that the output of the mines must be sold.

Speaking of the future of the Ore Association, one of the members said that the organization will be continued for statistical purposes and that it is more than likely that it will be revived next year. The association has been in existence eleven years and has regulated both prices and output. The situation has altered materially in that time. Many mines have changed hands, becoming the property of consumers, instead of remaining independent merchant properties. These things have brought with them some differing view points, and misunderstandings have resulted.

The break was due at any time, but was put off from time to time by the concessions which have been granted to merchant mines. The climax, however, has now been reached. Under existing conditions an association is impossible. A year of go-as-you-please methods will likely bring about changes which will permit the re-formation of the association.

PERSONAL.

J. Kreutz, the president of the Siegen Ore Association, and A. Ruhfus are now in this country.

Willis McKee, formerly chief engineer of the Republic Iron & Steel Company, Youngstown, Ohio, has resigned to take charge of the operating department of the Elyria Iron & Steel Company, Elyria, Ohio.

John R. Scott, manager of sales at New Orleans for the Carnegie Steel Company, has also been appointed manager of sales at Atlanta, Ga. W. M. Kelly, formerly in charge of the Atlanta office, has resigned.

Capt. Ransford D. Bucknam, superintendent and navigating officer for the William Cramp & Sons Ship & Engine Building Company, Philadelphia, has been appointed naval adviser to the Turkish Ministry of Marine.

Jesse Lewisohn has resigned his position as one of the managers of the United Metals Selling Company, but remains on the Board of Directors. The other manager is Urban H. Broughton, who represents the Standard Oil interests in the company.

J. Tatnall Lea has been elected president of the First National Bank of Philadelphia.

The firm of Charles Henry Davis & Partners, engineers and architects, of New York, has been dissolved. Charles Henry Davis & Co. of New York, composed of Charles Henry Davis and Nat Tyler, Jr., will act as agents of the American Road Machinery Company and the Good Roads Machinery Company. Timothy W. Sprague has established himself as consulting engineer, with headquarters at 4 State street, Boston, and John S. Griggs, Jr., will continue the practice of consulting engineering at 25 Broad street, New York.

Charles J. Kirk of the New Castle Forge & Bolt Company, New Castle, Pa., has been elected president of the local Chamber of Commerce. At a recent meeting several of the prominent manufacturers of the city were appointed on the various committees of the chamber for the ensuing year.

T. J. Brown has been appointed superintendent of the 40-inch mill, the rail department and the merchant department, and J. A. Durfee, superintendent of the open hearth and Bessemer steel department of the Minnequa works of the Colorado Fuel & Iron Company, Pueblo, Col.

J. C. Kafer of New York has returned home from Arkansas much improved in health.

Edward L. Dufourcq, who has had a long experience as a mining engineer in the Southwest and in Spanish America, has returned to consulting practice in New York, with headquarters in the Produce Exchange Building.

J. J. O'Brien, for four years cashier of the Chicago offices of the General Electric Company, has resigned to accept the position of general auditor of H. M. Byllesby & Co., engineers, New York Life Building, Chicago.

M. A. Steele has been appointed manager of the New Orleans branch of the Moline Plow Company, Moline, Ill., to be known as the Southern Moline Plow Company, and C. A. Banister has succeeded him as purchasing agent of the company.

W. A. Johnson, assistant manager of the coke department of Rogers, Brown & Co., Chicago, has been transferred to their Pittsburgh office. Harwood Wilson has been transferred from the Boston office to take Mr. Johnson's place.

J. B. Arnold, manager of the structural department of the Carnegie Steel Company at Chicago, will return

from a three weeks' pleasure trip in California next Monday.

John Eaton, president of the Chamber of Commerce of Pittsburgh, and also president of the Oil Well Supply Company, has returned home after a seven months' trip around the world. Mr. Eaton and his party traveled over 30,000 miles and 70 days were spent on sea.

E. E. Eshenshade, formerly manager of the finishing mills of the La Belle Iron Works, Steubenville, Ohio, has resigned and has been succeeded by H. K. Williams of Warren, Ohio.

John B. Allen has resigned his position as manager of the sales department of the Allis-Chalmers Company and will take a vacation of a few months before making any other business connection. Mr. Allen went to Milwaukee recently from Chicago to take charge of the sales department of the company.

MANUFACTURING.

Iron and Steel.

The Muskingum Valley Steel Company, Zanesville, Ohio, manufacturers of black and galvanized sheets, are now operating their entire five hot mills to full capacity. Goff, Horner & Co., Limited, Frick Building, Pittsburgh, are their sole agents.

In referring to the new tin plate plant of Follansbee Brothers Company, Pittsburgh, the statement was made that it would contain six sheet mills and two tin plate mills. This was an error, as the equipment will consist of six tin plate mills and two sheet mills.

The Juniata Steel & Iron Company, Greencastle, Ind., have filed a trust deed to their plant to secure an issue of \$100,000 of bonds. These have been taken by St. Louis capitalists. The company are getting ready to resume business. The capital stock has been increased from \$250,000 to \$500,000. Part of this stock has been taken by workmen, who will allow 25 per cent. of their wages to accumulate in payment for it. Horace S. Rumsey and Joseph Clark, St. Louis, have been elected directors, together with R. L. O'Hair, Samuel J. Mack, John W. Lovett, Wm. J. Richards, Francis M. Strong, J. H. Steberling, C. E. Cowgill, Louis E. Lathrop and Francis M. Lyon of Greencastle. The new officers are: President, R. L. O'Hair; vice-president, John W. Lovett; secretary, F. M. Lyon; treasurer, Central Trust Company. The plant was built two years ago, but has been idle since last fall.

The Pennsylvania Steel Company are making extensive improvements in their No. 2 blooming mill, at the Steelton, Pa., plants. The Steelton plants have been in full operation for the past two weeks for the first time in several months, and a busy summer is anticipated. The structural departments, especially the bridge works, are unusually busy. The company will within a month be running their furnaces at North Lebanon with coke from their own ovens. The work on the new Semet-Solvay coke ovens is nearing completion, and two of the three batteries will be put in operation before the close of May.

Philadelphia contractors are estimating on a foundry building, 61 x 160 feet; power house, 26 x 39 feet, and a finishing building, 24 x 40 feet, to be erected by the Matawan Steel & Iron Company, Matawan, N. J.

Joseph Wharton, Philadelphia, Pa., who operates furnaces at Port Oram, N. J., has acquired the iron mines of the New Jersey Mining Company, located in Hibernia, Mount Hope, Sparta, Mine Hill, Beach Glen and Wharton.

A sheet bar mill of the Sharon Steel Hoop Company, Sharon, Pa., which has been idle several weeks for repairs, has started up. During the shut down of this mill two new heating furnaces were added, and also some labor saving machinery. This company advise us they have large orders on hand for open hearth billets and sheet bars.

The plant of the Jackson Iron & Tin Plate Company, Clarksburg, W. Va., is to be sold at public sale on May 28 by the Security Trust Company of Wheeling, who are trustees of the company. The terms of sale are one-third cash and the balance in 6 or 12 months.

It is stated that work will be pushed actively on the new plant of the Metallic & Crucible Steel Company, at Latrobe, Pa. It is said that this company propose to make steel castings under a new process.

The Carnegie Steel Company are now rerolling old steel rails into lighter sections at the Lindsay & McCutcheon plant in Allegheny.

Additions and improvements being made to the plant of the Zenith Furnace Company, Duluth, Minn., have rendered necessary an increase in capital stock from \$600,000 to \$1,000,000. The company expect to begin producing coke in their Otto-Hoffmann by-product ovens in a very few days. They have decided to put their furnace into blast immediately and therefore will use all their coke in their own operations.

General Machinery.

The Mason Machine Works, Taunton, Mass., announce that arrangements have been made for the manufacture of the Campbell printing presses and autoplates at the Mason Works. It is expected that the transfer of the company's business from Plainfield, N. J., to Taunton will be made the coming summer.

The shops of the Adair Machine Works Company, Anniston, Ala., who were incorporated about two years ago, are located at the junction of the Louisville & Nashville and the Southern railroads. Electric power is used for operating the machinery. They do all classes of foundry and machinery repairing, and also handle second-hand machinery and boilers.

The Mansfield Engineering Company, Mansfield, Ohio, recently placed in receivers' hands, have filed a schedule showing \$60,909 assets and \$68,465 liabilities.

The iron foundry and machine shop which has been conducted for 20 years at Jamestown, N. Y., by Benj. Nichols & Son, has been taken over by the Jamestown Iron Works, recently organized. The new company will be under the same management as the old, with the exception of Benjamin Nichols, who has retired.

The Vaughn Machine Company, Peabody, Mass., have bought of the Loop Lock Company, Waltham, the latter's patents and rights, as well as patterns for their shoe stitching machine, which will hereafter be built at the Vaughn company's plant, where there is ample room for this additional department. The Vaughn company have devoted themselves to the manufacture of leather working machinery, and the addition of a stitching machine will make an entirely new line for them.

H. E. Conant is building a new machine shop at Hartland, Maine.

The Hyatt Roller Bearing Company, Harrison, N. J., have opened an office in Philadelphia, at 306 Drexel Building, with D. B. Latimer in charge. Among the recent installations in that city is the Frankford Arsenal of the United States Government. The Frankford installation consists of several hundred hangers for line shafting. Mr. Latimer will cover not only Philadelphia, but also the nearby cities in Delaware and New Jersey.

Gaar, Scott & Co., Richmond, Ind., threshing machine manufacturers, claim to have the largest exhibit of that kind at the St. Louis World's Fair. This company were the first in their line to make inroads in the foreign trade, their machinery being shipped to nearly every wheat growing country in the world. One of the latest is a rice threshing machine designed for the Philippines. The company's plant covers 20 acres.

The Headson Tool & Mfg. Company, New York, have been admitted to Indiana, where they have notified the Secretary of State they will invest \$50,000. Herman Pottlitzer of Lafayette, Ind., is named as the company's agent for that State. A three-story factory building is about completed for the company at Lafayette, and the equipment is being installed. The factory will open with 50 skilled workmen. Frank A. Headson will be general manager.

The Allis-Chalmers Company's Denver branch has contracted for the erection of a 1000-ton cyanide plant with the Cripple Creek Homestake Mining & Reduction Company. W. O. Temple, general manager of the latter company, advises that the work of construction will soon begin.

The Heyl & Patterson Company, Incorporated, Pittsburgh, have received a contract for the building of a large coal handling, ash handling and sand handling plant, to be built in the McKees Rocks yards of the Pittsburgh & Lake Erie Railroad, at McKees Rocks, Pittsburgh. There will be three different structures for the handling of coal, ashes and sand. The structures will vary from 50 to 60 feet in height and each will be of steel construction.

The Adrian Mfg. Company, manufacturers of brick and tile machinery, Adrian, Mich., have purchased the works and business of the Adrian Brick & Tile Machinery Company of Adrian. The company intend to continue the manufacture of all machinery used in the manufacture of brick and tile, as well as conducting a general foundry and operating a wagon works.

The recently incorporated Walton-Van Huffel Mfg. Company, Galesburg, Ill., have elected the following officers: President, Peter Van Huffel; vice-president, H. A. Walton; general manager, M. S. Walton, and secretary-treasurer, W. P. Martin. The company are a consolidation of the Walton Mfg. Company and Peter Van Huffel & Sons, and will occupy the plant formerly operated by Peter Van Huffel & Sons, into which they are now moving the machinery of the Walton Mfg. Company. The company do a general foundry and machine business and in a short time will take up the manufacture of gas engines.

The Victor Talking Machine Company, Camden, N. J., whose plant was recently badly damaged by fire, will rebuild as soon as possible.

A. H. Wells, Waterbury, Conn., manufacturer of small brass and copper tubing, is to build a new power house and machine shop this season. They will be in one building, 58 x 65 feet, one story. Mr. Wells will install a 75 horse-power Harris-Corliss engine and a generator not yet decided upon. A 40

horse-power Beggs boiler will provide the necessary additional power.

Power Plant Equipment.

Engineer H. M. Greer, Troy, N. Y., is preparing plans for duplicate machinery for the water works pumping station. A 500-gallon pump and a 25 horse-power engine will probably be purchased.

The Board of Public Service, Middletown, Ohio, are receiving bids until May 17 for a 3,000,000-gallon pumping engine.

The plant of the White-Blakeslee Mfg. Company, Birmingham, Ala., which was almost completely destroyed by fire early in the year, has been rebuilt on modern lines and is now in operation. The company manufacture gasoline engines.

The Brown-Corliss Engine Company, Corliss, Wis., have just shipped the last of six 2500 horse-power engines ordered by the Jersey City Railway Company. Five of these engines are running and the sixth will be erected and running in about two weeks. One of these engines is at Secaucus, the other five being at Newark. The engines are the Brown Corliss vertical cross compound, with 32 and 64 inch cylinders, 95 revolutions per minute, and are connected to General Electric alternating current generators of 3200 volts.

Two of the largest cross compound steeple blowing engines ever erected have been finished at the works of the William Tod Company, Youngstown, Ohio, for No. 4 furnace at the Ohio works and furnaces of the Carnegie Steel Company. They are each 55 feet high and weigh approximately 675 tons, having a 75-ton fly wheel. The low pressure cylinder is 110 inches, high pressure 58, with 108-inch air cylinder and 60-inch stroke. One of these engines was shipped last month, requiring a special train of 14 cars. The other will follow this week.

Foundries.

The Brown Foundry, Middletown, Conn., has been leased by Frank McAllister, who will produce brass and bronze castings.

The Sessions Foundry Company, Bristol, Conn., make emphatic denial of a story that the New York, New Haven & Hartford Railroad are negotiating for the Sessions property, with a view to establishing car shops there.

The Boston Steel & Iron Company, Boston, Mass., have been placed in the hands of receivers by the United States Circuit Court sitting at Boston. This action was the result of a bill filed by the Cambria Steel Company of Philadelphia. The receivers are authorized to wind up the company's affairs. They are manufacturers of and dealers in structural steel and iron.

The George S. Barcus Company, Rensselaer, Ind., have moved their plant to Wabash, Ind., where they bought the real estate and machinery of the Star Mfg. Company. The company will engage in the foundry business.

L. Schreiber & Sons Company, Cincinnati, Ohio, who have just completed a fine new foundry at Norwood, one of Cincinnati's suburbs, intend eventually moving their entire plant to this point. At present four buildings are completed, including the main foundry, cleaning shop, pattern and model shop and power station. When the structural shops are removed to the new site the plant will consist of 30 buildings and will be of about double the capacity of the old plant. Complete new equipment has been installed in the present new buildings, and when the new plant is completed a great deal of new machinery will have been installed. Just at present no new machinery is being purchased.

The Valley Wind Engine & Iron Company, Bay City, Mich., have purchased from the A. F. Bartlett Company, Saginaw, the latter's entire galvanizing plant. Machinery, equipment, &c., is being removed from Saginaw to Bay City, where it will be installed in a building now being erected for the purpose. This structure is 40 x 60 feet. Besides this building the Valley company are also erecting a foundry 40 x 48 feet. Both buildings are expected to be completed within five weeks.

Bridges and Buildings.

The Milwaukee Bridge Company have been awarded the contract for a bridge across Bartlett street, Milwaukee, Wis., to cost \$25,200.

The American Bridge Company have been awarded the contract for 700 tons of structural steel for the new buildings of the American Malting Company in Milwaukee.

The West Virginia Bridge & Construction Company, Wheeling, W. Va., have secured a contract from the Wheeling & Western Traction Company for six bridges, the spans ranging from 60 to 85 feet in length. They have also received a contract for ten bridges to be built on the Coal & Coke road, the bridges ranging from 65 to 150 feet in length. They are also making three bridges for shipment to Ft. Worth, Texas.

The American Bridge Company have been awarded the contract for 350 tons of structural steel work for the new office building in Milwaukee of the Northwestern National Fire Insurance Company.

The Worden-Allen Company of Milwaukee have secured the contract for 500 tons of structural steel to be used for the Commerce street car station of the Milwaukee Electric Railway & Light Company.

Fires.

The Freeport Spring Company, Freeport, Ill., suffered loss by fire recently to the extent of \$4000. They will be in running order again in ten days or two weeks.

The Marion Malleable Iron Works, Marion, Ind., built three years ago at a cost of \$300,000 and employing 300 men, were almost totally destroyed by fire April 27. The plant is owned by Buffalo, Syracuse and Troy capitalists. The loss is largely covered by insurance.

The plant of the Kentucky Vitified Brick Company, Louisville, Ky., was burned April 27, causing a loss of \$50,000.

Half of shop No. 5 at the West Albany plant of the New York Central Railroad was destroyed by fire last week. The loss is placed at \$100,000, including several cars.

Hardware.

The Lawrence Mfg. Company, Toledo, Ohio, manufacturers of the Frost Queen cream separators, are now located in their new plant, a three-story brick structure, 50 x 80 feet, adjoining the Lake Shore & Michigan Southern Railroad. The new quarters give them fully 50 per cent. increased capacity. They report a very satisfactory business in their productions, and have added two new styles to their line of cream separators.

The Hamilton Metal Pattern Company, Hamilton, Ohio, who have been manufacturers of a general line of brass goods, have changed their name to the National Caster Company, and will devote most of their energies to the manufacture of anti-friction two-wheel casters, the success of which has led the company to make this change in name and policy. W. S. Brown, who was for some years county treasurer of Hamilton County, in which the cities of Cincinnati and Hamilton are located, resigned that position last fall to give his entire time to the manufacturing business, and is now secretary-treasurer of the company; C. J. Parrish is president; C. S. Bosch, vice-president, and John Kaefel, manager.

The Farmers' Co-operative Harvesting Machine Company, Springfield, Ohio, have been organized. William N. Whitely, well known in connection with the manufacture of reapers, is the sponsor of the new company. O. E. Bradfute has been elected president; S. H. Ellis, vice-president; C. F. Jackson, secretary, and A. W. Grant, treasurer. The directors of the new company are O. E. Bradfute, S. H. Ellis, C. F. Jackson, A. W. Grant, W. N. Whiteley, R. L. Holman, J. J. Hoppes, Lewis Laybourne and W. N. Whitely, Jr. The Executive Committee is composed of W. N. Whitely, R. L. Holman, A. W. Grant, J. J. Hoppes and W. N. Whitely, Jr. Mr. Bradfute is a man of much experience in agricultural matters, being secretary of the Ohio Agricultural Experiment Station, president of the Ohio Live Stock Association, member of the Executive Committee of the National Live Stock Association, and lecturer before Farmers' Institutes. The plans of the company contemplate a co-operative plant. The workmen will be expected to purchase a certain amount of stock in the concern, to be paid for in labor, and every one connected with it will be expected to own stock. The stock is divided into shares of \$25 each and will be sold at par. It will be offered to farmers, and every farmer owning stock will get a reduction of 10 per cent. on his machinery. Sufficient funds have already been paid in, it is said, to assure the building of a factory, and work will proceed on the plans. The company will manufacture binders, reapers and mowers, and, we are advised, control numerous patents on improvements in this department of industry.

George H. Bishop & Co., Lawrenceburg, Ind., and Cincinnati, Ohio, owing to the increased demand for their higher grade productions, have found it necessary to make such changes and alterations in their present plant as will increase their capacity fully 25 per cent. This will be accomplished by the installation of additional machinery and remodeling the greater portion of the present quarters, and it is expected to complete the work within the next 60 days. The company will thus be in a position promptly to take care of orders which have been turned away in the past owing to inadequate facilities.

The Neely Saw & Knife Company, who are moving from Greenville, Ohio, to Anderson, Ind., have elected the following new officers: President, Wm. F. Edwards; vice-president, J. K. Johnson; secretary, H. C. Neely; treasurer, Chas. Kemmery. The new factory will be of brick, one story, arranged in a square with an open court, and will be 130 feet long by 108 feet wide. Provision is made for a second story.

The King & Andrews Company, Chicago Heights, Ill., in addition to their former products of sash weights, counter weights, cast washers, post maulls and all kinds of gray iron castings, expect within a few weeks to be making a line of soil pipe and fittings.

Dewey Sash Weight Company have purchased the plant and stock of the Enterprise Foundry Company, Denver, Col., and are continuing the business as heretofore. They are expecting to increase their facilities.

E. O. Faeth has sold his one-half interest in the Des Moines Iron Company, Des Moines, Iowa, to J. E. and D. A. Baum, owners of the other one-half. The Messrs. Baum will continue the business at Des Moines with little or no change in the organization.

Miscellaneous.

The Nernst Lamp Company have established a branch office auxiliary to the Pittsburgh district office, at 537 Scofield Building, Cleveland, Ohio, in charge of J. C. Wright. He will carry a stock of Nernst lamps and renewal parts, insuring prompt attention to all orders in that district. The company have recently received two large orders, one from the Saco & Pettie Machine Shops, Biddeford, Maine, for 575 three-glow lamps, and one from the Arlington Mills, Lawrence, Mass., for 600 lamps of the 44 watt type. The second order comes in the form of a testimonial, as quite a large installation of Nernst lamps had already been made by the latter company.

The foundry property of the Sterling Foundry Company, Greenwich, Conn., has been purchased by Joseph Montell, who will occupy the plant for his boat building business.

W. H. Hume & Co., Birmingham, Ala., who commenced business as manufacturers' agents on September 1 of last year, at 229 Woodward Building, are Southern agents for the William Tod Company, Youngstown, Ohio; Savage Fire Brick Company, Pittsburgh, Pa.; Mt. Union Silica Brick Company, Mt. Union, Pa.; Blaisdell Machinery Company, Bradford, Pa., and others. The first three months after commencing the firm had a very light business, but since then it has been increasing satisfactorily.

The Means & Fulton Iron Works, Birmingham, Ala., have a contract for a grain storage tank 90 feet in diameter and 50 feet high, with a ball shaped top, 16 feet to the apex, making the total height 66 feet; also a contract for a stand pipe 25 feet in diameter, with height of 120 feet, for the city of Durant, I. T., and one for oil tank 50 x 40 feet for Weatherford, Texas, and two of the same size for Whitewright, Texas.

The headquarters of the Lehigh Pulverizer Company, recently incorporated, are located at Catasauqua, Pa., and not at Allentown, as was noted in these columns. The company do not intend to erect a plant at the present time.

The McKenna Brothers Brass Company, Pittsburgh, have awarded the contract for their new store and office building, at Barberton, Ohio, to Charles G. Lutz of that place. The building will contain four large storerooms, which, it is contemplated, will be the finest in Barberton. The remainder of the building will be given up to offices and rooms for public purposes.

The Daleville Sand-Lime Brick Company have been incorporated at Muncie, Ind., with \$50,000 capital stock. They will build a factory for the manufacture of sand-lime brick, tiling, art stone, ornamental tile, &c.

The Farmers' Co-operative Harvesting Machine Company, recently organized by William N. Whitely, have been formally launched in Springfield, Ohio, where the headquarters and principal plant will be located. O. E. Bradfute was elected president; S. H. Ellis, vice-president; C. F. Jackson, secretary, and A. W. Grant, treasurer. The directors of the new company are O. E. Bradfute, S. H. Ellis, C. F. Jackson, A. W. Grant, W. N. Whitely, R. L. Holman, J. J. Hoppes, Lewis Laybourne and W. N. Whitely, Jr. The Executive Committee is composed of W. N. Whitely, R. L. Holman, A. W. Grant, J. J. Hoppes and W. N. Whitely, Jr.

The Atlanta Metal & Bottle Company, Atlanta, Ga., have changed their location to 53-59 Ridge avenue, where they have erected three buildings, one 60 x 100 feet, two stories, solely for warehouse purposes, and another, 50 x 100 feet, as warehouse, in which is the office. The third building is smaller, but will soon be extended. They handle scrap iron, steel and metals and report a strong local demand for scrap.

The American Fiber & Insulating Company, St. Louis, have purchased a 20-acre stone quarry near Alexandria, Ind., and will build additions to their mineral wool plant there for the manufacture of roofing paper and allied lines. The company will remove from St. Louis to Alexandria. The products of the company—mineral wool and rock fiber felt—are used in the manufacture of refrigerators and insulating material.

We are informed that the United States Tube Works, Buffalo, N. Y., purchased in March at receivers' sale by George Timmins of Syracuse, has recently been disposed of to a syndicate, who contemplate the utilization of the buildings and land for other purposes. We are further informed that there is no immediate prospect of a resumption of operations of tube making.

The Falcon Rubber Company, who were incorporated under Connecticut laws February 29, 1904, with a capital stock of \$60,000, are preparing to engage in business at 32 to 46 Wooster street, New Haven, Conn., where they have a floor space of about 50,000 square feet. They are now installing a 250 horse-power Hazelton boiler and are to put in a 225 horse-power Fitchburg Steam Engine Company's engine. The special rubber machinery which they will use is being built for them by the Birmingham Iron Foundry, and they state that they have already arranged for the other machinery which they will require. It is expected that active operations will commence July 1, 1904, and the company will at the start manufacture a full line of druggists' and surgical rubber goods. Albert C. Coe is president; Francis P. Bush, treasurer; Charles E. Longden, superintendent, and Dennis B. Martin, manager of sales.

The New Albany Water Company, New Albany, Ind., have issued \$750,000 of 5 per cent. gold bonds, of which \$300,000 is to be used in paying off indebtedness incurred in improving and extending the system, \$150,000 in redeeming an issue of bonds outstanding, and the remaining \$300,000 to pay the cost of a filtration system which is to be installed within three years.

The Miter Lock Box Company, Indianapolis, have purchased for \$30,000 a site at Missouri and Ohio streets for a factory.

The Hussey Mower Company, Knightstown, Ind., have been incorporated with \$200,000 capital stock by R. W. Hussey, F. S. Hussey and Thomas G. Morris. They will manufacture mowers.

The Swift Packing Company, St. Joseph, Mo., will increase the size of oil and boiler houses and install new boilers at their plant at St. Joseph. The oil house is now a five-story brick building, four bays deep, and it is the purpose to add three more bays. The boiler house will be extended to accommodate the installation of two additional boilers of 500 horsepower each. All material has been purchased, and it is thought the buildings will be completed by June 1.

The Syracuse Boat Mfg. Company have been incorporated at Syracuse, Ind., with \$10,000 capital stock, by Francis Ott, LeRoy Daer and Asbel Cornelius.

Armstrong Mulford of Plainfield, N. J., has been appointed receiver for the Ideal Cash Register Company, Bound Brook. The liabilities are said to be over \$360,000. It is alleged that the assets will not exceed \$1000.

The Hunkin Brothers Construction Company, Cleveland, Ohio, have secured the contract for the construction of a large carbon works at Clarksburg, W. Va., for the Washington Carbon Company. There will be five large buildings of steel and fire proof construction, and the entire plant will cost about \$250,000.

C. J. Costello and K. P. Boulton of Chicago are organizing a company for the manufacture of the Lapointe simplex type of automobile. This machine will be built in two models, two and four cylinders, and is intended to supply the trade with a high class machine at a relatively low cost. An option has been secured on the plant formerly operated by the Standard Pneumatic Tool Company and later acquired by the Chicago Pneumatic Tool Company at Aurora, Ill.

The Excelsior Bobbin & Spool Company, Newtown, Pa., have awarded a contract for the construction of a group of new factory buildings.

The Thomas Carlin's Sons Company, Allegheny, Pa., have a number of large orders on hand for steel plate construction work. Among these is an order for a number of steel tanks 16 feet in diameter and 14 feet deep for the Brighton Chemical Company, New Brighton, Pa. They also have an order from the Berwind Coal Company, Windber, Pa., for steam separators and receivers, and also for a large number of steel stacks for plants of the Crucible Steel Company of America. The Thomas Carlin's Sons Company have recently equipped their works with compressed air flange and forging apparatus and are now in position to handle heavy steel plate construction work of all kinds.

A. E. Schlieder, vice-president and general manager of the Monarch Acetylene Gas Company, Buffalo, N. Y., is interested in a new company who are to build an acetylene gas plant in Mexico.

The Hilton Valve Company, Middleboro, Mass., announce that they have disposed of their patents and machinery to the Scovill Mfg. Company, Waterbury, Conn. The company manufactured a capless valve for bicycles.

The Gulf Refining Company, Pittsburgh, inform us that the daily press reports of the fire at their refinery at Port Arthur, Texas, were greatly exaggerated. While the production of some of their oils will be curtailed for a short time, the company have an ample stock on hand to take care of all orders. Refinery No. 2, their lubricating oil plant, was not damaged, and they are prepared to make prompt shipment of all grades either direct from the refinery or from their stations at Boston, New York, Philadelphia and New Orleans.

The Keystone Boiler & Radiator Company, Huntingdon, Pa., have made an assignment. The liabilities are about \$100,000 and assets \$80,000.

The B. V. Covert Automobile Works, Lockport, N. Y., are soon to double the size and capacity of their manufacturing plant.

The Talsey Pneumatic Service Company, manufacturers of pneumatic tube systems for stores, offices and factories, contemplate moving their plant from Indianapolis to Buffalo. An enlarged plant is necessary, owing to the rapidly increasing business of the company. Frank H. Cooper of the Siegel-Cooper department stores of New York and Chicago is the president of the Talsey Company.

The A. D. Meiselbach Motor Vehicle Company have been incorporated in Milwaukee, Wis., for the purpose of manufacturing automobiles, and will, at an early date, commence the erection of factories in North Milwaukee, one of the suburbs of the city. The capitalization of the company is \$50,000, and the incorporators are N. Miller, Fred D. Clinton and Byron R. Godfrey. Mr. Meiselbach will be the active manager of the new concern, which will engage in the manufacture of all styles

of motor vehicles. Mr. Melselbach owns several patents, and what are known as the McKaig patents will also be used. For several years Mr. Melselbach was the owner of the A. D. Melselbach Company's bicycle plant in North Milwaukee, which was later sold to the American Bicycle Company, after which he formed a typewriter company. Plans have been completed for the erection of eight brick and frame buildings on the ground owned by the company in North Milwaukee, adjoining the tracks of the Chicago, Milwaukee & St. Paul Railroad. The cost will aggregate \$30,000, and it is planned to complete the construction work by August 1.

Trade Publications.

Boilers and Engines.—Circular I, from the St. Louis Well Machine & Tool Company, St. Louis, Mo., contains illustrations and descriptions with tables of sizes of locomotive portable boilers, the Warren oil well engine and St. Louis portable boiler engine. It is of standard size and is intended for insertion in binder which the firm supply to those on their mailing list.

Air Compressors.—The Blaisdell Machinery Company, Bradford, Pa., have issued bulletin No. 11, describing classes AA and AD single air compressors. Class AD embraces single steam driven forms, ranging in size from those having a piston displacement of 30 to 529 cubic feet. Class AA is of the belt driven form and covers the same range of sizes. The various parts of the air compressor end are separately illustrated and described.

Steam, Water and Air Specialties.—John Acton, 118 John street, Brooklyn, N. Y., has issued a catalogue on his modern automatic steam, water, air and vacuum specialties. The steam specialties covered are pop safety valves, reducing valves for high and low pressure service, for high duty and for the vacuum system of heating; balance and back pressure valves, relief valves; water specialties, reducing vacuum relief valves, governors, boiler check valves and thermostat for hot water heating. Other specialties are an automatic pump receiver and regulator, a water separator or grease extractor, a damper regulator, a steel roller mill, a Bogardus mill and two forms of glass machinery.

Pumping Machinery.—Bulletin No. 2, a supplement to catalogue 1901 on pumping machinery, has been issued by the Hill Machine Company, Sixth and Jackson streets, Anderson, Ind. Among the pumping equipments shown are deep well pumps and double acting power pumps driven both through gearing by electric motors and through belts by gas engines. The Hill noiseless house pump is another feature. It is intended for pumping where the water source has insufficient head to carry it to the top of the building.

Contractors' Machinery, Tools and Supplies.—A catalogue 7 x 10 inches in size and containing 254 pages has been brought out by the Harold L. Bond Company, 140 Pearl street, Boston, Mass., which shows all forms of tools and machinery for construction work, including boilers, engines, pumps, derrick fittings, dump cars, blocks, rock drills, dynamite and blasting supplies, iron and steel, and, in general, railroad, mill and contractors' supplies. It is an exceedingly comprehensive catalogue, and being well indexed will prove a valuable reference book for users of all forms of apparatus coming under these headings.

Brick Making Machinery.—The Arnold-Creager Company, New London, Ohio, have recently issued catalogue No. 25, devoted exclusively to brick making machinery and brick makers' supplies. The firm act as consulting and contracting engineers for the building of brick plants, and are in a position to furnish everything necessary, from engines and boilers to molding tools. All pertaining peculiarly to brick making is manufactured by the concern and is described and illustrated in detail in the catalogue, a 7 x 10 inch book of 56 pages.

Wood and Metal Working Machinery.—The Colburn Machine Tool Company, Franklin, Pa., are now distributing catalogue A on the Colburn universal saw table and six bulletins on boring and turning mills. The saw table is arranged to tilt, and the gauges are adjustable for all angles, so that it is possible to do a great variety of work with the machine. Its construction and many accomplishments are shown in beautiful half-tones. Bulletin No. 4 is an illustration and description of a 60-inch vertical boring and turning mill. Bulletin No. 5 is the same for a 53-inch mill; bulletin No. 6 for a 65-inch mill, and bulletins Nos. 7 and 9 for 44-inch mills, one of which is equipped with a swivel turret head. Bulletin No. 10 contains a more elaborate description of the 34-inch vertical boring and turning mill, where a single center post to support the cross rail replaces the ordinary double post construction. This tool is also equipped with a swivel turret head, making possible five distinct operations in rotation without resetting any tools.

Electrical Apparatus.—The following have been received from the General Electric Company, Schenectady, N. Y.: "Notes on Series Street Incandescent Lighting," a reprint of a paper read by Welles E. Holmes before the New England Association of Electric Lighting Engineers on March 18, 1903, describing an installation which is controlled by a constant current transformer by means of reactive coils, features of which are illustrated in the booklet. Bulletin No. 4340 is on meridian lamps with prismo glass shades, parts of which are shown in detail. No. 4369 is on the subject of direct current motor controllers for power and mining machinery, showing several types and lists the complete range of sizes. Bulletin No. 4370 is on three-phase air blast transformers, and explains their general construction,

principle of operation and advantages. No. 4371 concerns electric ground detectors, which are shown in single phase and three-phase form; diagrams explaining the reading of the meter are given and also diagrams indicating the wiring connections for both forms. No. 4372 shows some equipments for blue printing with electric arc lamps which were originally developed for use in the blue print department of the General Electric Company, and are now offered to the public.

Steam Turbines.—A catalogue of the Westinghouse-Parsons steam turbines has recently been brought out by the Westinghouse Machine Company, East Pittsburgh, Pa. It is probably one of the most comprehensive catalogues that has ever been issued on this subject and will prove of considerable interest. The introduction first calls attention to the advantages of the steam turbine over the piston engine, after which a more complete discussion is taken up, partly historical, leading up to the present form. It is profusely illustrated with half-tones of installations, the largest unit being a 7500 horse-power turbine generator unit. An interesting part deals with the commercial features, citing a number of tests, among others made at the Yale & Towne Mfg. Company's plant. A description of this plant was given in the April 21 issue of *The Iron Age*.

Machine Tools.—Scott & Sons, Medford, Mass., are showing in a new catalogue a line of turret lathes equipped with the Ess Ess revolving chucks, collet chucks, automatic dies and automatic taps. The lathe has recently been improved, being made heavier and more substantial in its various parts to meet the requirements that now prevail. The use of the chucks is claimed to effect a considerable saving in time, as the lathe can be kept running continuously. The automatic taps and dies are separately illustrated and described and are said to cut a better thread than the ordinary solid die, do it in one-half the time and eliminate all unnecessary wear and tear.

NOTES.

Joseph T. Ryerson & Sons, Chicago, Ill., have issued their monthly journal and stock list for April. The leading articles are, "Stability of the Internal Furnace Boiler for Large Station Work," "Hardening and Tempering Punches," and "A Breeching for a Scotch Boiler." The stock list follows and covers iron and steel specialties, Continental boilers, Morrison corrugated furnaces, shears, punches, rolls, hydraulic power machinery, small tools and accessories, stock boilers, &c. It concludes with useful information and tables of the weights of sheets, plates, heads, rivets, bars, angles, &c.

The Great Lakes Engineering Works, Detroit, Mich., have issued a booklet appropriately entitled "Great Lakes Condensed Facts," as it deals with condensing apparatus, as manufactured by this concern. Views are shown of a combined twin vertical air pump and condenser, and the construction is more clearly indicated by a line drawing elevation and cross section. It is claimed to produce the highest vacuum possible by mechanical means.

The Dean-Waterman Company, Covington, Ky., have issued a booklet on the Hancock gas and gasoline engines, which they manufacture. A brief description of the engine, which is made in sizes of from 1½ to 25 horse-power, is followed by a list of recent sales and numerous testimonials.

The Niles Tool Works, New York City, are distributing a circular describing a new disk grinding attachment for use on the American drill grinder. It is intended for grinding and polishing in great variety and is of comparatively low cost.

The Burt Mfg. Company, Akron, Ohio, describe the Cross style B oil filter in a circular recently issued. It is intended for automatically separating water from waste lubricating oil and is made in sizes having a filtering capacity of from 3 to 500 gallons of oil per 24 hours.

The Clinton Foundry & Machine Company, 95 Liberty street, New York City, manufacturers of cast iron flange pipe and flange fittings, have compiled a table of weights of cast iron pipe and flanges for same, which is said to be somewhat more comprehensive than anything hitherto published, and is believed will prove of value to the users of pipe in making estimates.

A folder, "Will It Pay You to Change to Electric Wagons. How to Find Out," is being issued by Hayden Eames, Cleveland, Ohio, who is the selling agent for the automobile products of the Federal Mfg. Company, also of Cleveland. The pros and cons are concisely stated and the deductions are likely to prove of interest to those contemplating such a change.

The Buffalo Forge Company, Buffalo, N. Y., are issuing a new eight-page pamphlet illustrating the Buffalo hand blowers. These are of the form described in *The Iron Age* of March 31.

Jeffrey Mfg. Company, Columbus, Ohio, recently issued circular 73, giving a condensed summary of the lines manufactured: conveying, dredging, coal washing and drying machinery, drills and electric locomotives, presented for the most part by illustrations with brief explanatory captions.

The Globe Machine & Stamping Company, 970 Hamilton street, Cleveland, Ohio, are mailing a folding card calling attention to the Globe tilting oblique tumbling barrel. The features of excellence are concisely enumerated.

The Crocker-Wheeler Company, Ampere, N. J., are distributing bulletin No. 44, which contains an interesting description of the Conneaut & Erie Interurban system, reprinted from the *Street Railway Journal* of February 6, 1904. It treats of the line, overhead construction, car equipment and power plant. The electrical end of the equipment is of the Crocker-Wheeler manufacture and includes two railway type generators, 400 kw. capacity each, and a booster having a full load current capacity of about 300 amperes.

The Iron and Metal Trades

To many in the Iron trade the decision of the merchant Ore companies at the Cleveland meeting to abandon the Ore Association came as a surprise. In the prolonged negotiations there were three principal phases. The producing-consuming interests, with the United States Steel Corporation at the head, first held out for prices approximating those of last year. Some of the leading merchant Ore interests demanded that lower prices be made to protect their customers. Since the Steel companies did not expect to sell any Ore, they finally agreed to let the merchant Ore companies fix the prices for the season. This they did at the last New York meeting, making the price of Standard Old Range Bessemer \$3.50, as compared with \$4.50 during the previous season; Mesaba Bessemer, \$3.25; Old Range non-Bessemer, \$2.85, as compared with \$3.65, and Mesaba non-Bessemer, \$2.65, as compared with \$3.65 last year.

The third phase of the question was settled at the Cleveland meeting of the merchant interests yesterday, the Steel companies not being represented. The purpose was to agree upon an allotment of tonnage, and on this the whole broke down. It appears that as early as last season one of the leading merchant Ore firms entered into a number of contracts for the delivery of Ore with furnace companies, extending over a number of years in some instances. During the last few weeks other Ore agents and owners have made similar long term contracts, extending in some cases over only a few years with options of renewal. In some instances they are based on sliding scales fluctuating with the selling prices of Pig Iron. At the meeting the existence of these contracts proved an effectual bar to any agreement, it being stated that in one case the aggregate of these commitments was greater than the total possible allotment. The refusal to purchase the excess in the open market had the natural result.

The disagreement among the Ore companies comes at a very inopportune time. It is stated, very correctly, that the lower prices for Ore have been long since discounted by the furnacemen in their prices for Pig Iron. But while this is true to a considerable degree, it is doubtful whether that discounting has gone to its full length, and to that extent the matter is a disturbing factor, which may have its influence, too, upon the prices of pooled rolling mill products.

The event of the week in the Foundry industry has been the closing of the contracts for the Castings for the first section of the Pennsylvania tunnel, involving 52,000 tons of Castings for the tunnel lining and 12,000 tons of Screw Piles. The work has been divided equally between two foundries, one at Wheeling, W. Va., and the other at Buffalo, at figures far below those made by works on the Atlantic seaboard. The furnaces of this section therefore lose this tonnage, which, however, will not be taken out of the market until well along in this year and will extend over the whole of 1905.

The Pig Iron markets are weaker in all the leading producing sections with the exception, possibly, of Eastern Pennsylvania. At least one leading interest in the South is ready to take business at \$9.75 per ton for No. 2 at Birmingham, and lower prices for local Foundry Iron are made in the Central West and in the Chicago district. Bessemer Pig, too, is weaker. The bids for 30,000 tons of Cast Iron Pipe for Cincinnati are being opened today.

Somewhat more encouraging news comes from those whose customers are the railroads. The rail makers have taken quite a little tonnage during the past ten days, the aggregate being about 75,000 tons, mostly taken by one mill. Altogether, the tonnage booked to date and carried over from last year is about 1,400,000 tons, of which, of course, a good deal has already been delivered. The reports from the car building interests, too, indicate a somewhat better demand.

There has been little change in the principal lines of Finished Iron and Steel, the demand in the majority of cases being spasmodic in character and rather disappointing in volume.

Old Material is weak all along the line.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

	May 4, 1904.	April 27, 1904.	April 6, 1904.	May 6, 1903.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	\$15.00	\$15.00	\$15.00	\$21.00
Foundry Pig No. 2, Southern, Cincinnati	12.50	12.50	12.50	19.25
Foundry Pig No. 2, Local, Chicago	14.00	14.00	14.00	21.50
Bessemer Pig, Pittsburgh	13.85	13.85	14.35	20.10
Gray Forge, Pittsburgh	12.50	12.85	13.25	20.00
Lake Superior Charcoal, Chicago	15.00	15.00	15.25	24.50

BILLETS, RAILS, &c.:

Steel Billets, Pittsburgh	23.00	23.00	23.00	31.00
Steel Billets, Philadelphia	25.00	25.00	25.50	29.50
Steel Billets, Chicago	24.00	24.00	24.00	32.60
Wire Rods, Pittsburgh	30.50	31.00	31.00	37.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL:

O. Steel Rails, Chicago	11.00	11.50	11.50	18.50
O. Steel Rails, Philadelphia	13.00	13.75	15.00	21.50
O. Iron Rails, Chicago	17.00	17.00	16.50	24.50
O. Iron Rails, Philadelphia	17.25	18.00	18.50	24.50
O. Car Wheels, Chicago	14.00	14.00	14.00	24.00
O. Car Wheels, Philadelphia	13.00	13.50	13.50	24.00
Heavy Steel Scrap, Pittsburgh	13.00	13.00	14.00	21.50
Heavy Steel Scrap, Chicago	10.00	10.50	11.50	18.50

FINISHED IRON AND STEEL:

Refined Iron Bars, Philadelphia	1.48½	1.48½	1.48½	1.93½
Common Iron Bars, Chicago	1.45	1.45	1.50	1.85
Common Iron Bars, Pittsburgh	1.35	1.35	1.40	1.89½
Steel Bars, Tidewater	1.49½	1.49½	1.49½	1.75
Steel Bars, Pittsburgh	1.35	1.35	1.35	1.60
Tank Plates, Tidewater	1.74½	1.74½	1.74½	1.80
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater	1.74½	1.74½	1.74½	1.73½
Beams, Pittsburgh	1.60	1.60	1.60	1.60
Angles, Tidewater	1.74½	1.74½	1.74½	1.73½
Angles, Pittsburgh	1.60	1.60	1.60	1.60
Skelp, Grooved Steel, Pittsburgh	1.35	1.35	1.35	2.05
Skelp, Sheared Steel, Pittsburgh	1.35	1.35	1.35	2.10
Sheets, No. 27, Pittsburgh	2.10	2.15	2.15	2.65
Barb Wire, f.o.b. Pittsburgh	2.50	2.50	2.50	2.60
Wire Nails, f.o.b. Pittsburgh	1.90	1.90	1.90	2.00
Cut Nails, f.o.b. Pittsburgh	1.75	1.75	1.75	2.15

METALS:

Copper, New York	13.37½	13.37½	13.12½	14.75
Spelter, St. Louis	5.00	5.05	5.00	5.40
Lead, New York	4.50	4.50	4.50	4.37½
Lead, St. Louis	4.40	4.40	4.42½	4.23½
Tin, New York	27.95	27.87½	28.35	29.90
Antimony, Hallett, New York	7.25	7.25	7.25	7.00
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.64	3.64	3.64	3.90

Chicago.

FISHER BUILDING, May 4, 1904.—(By Telegraph.)

This is a weak market both in Pig Iron and finished and semifinished lines of Iron and Steel. Business is almost at a standstill, and such orders as are received are for immediate shipment of such materials as manufacturers must have to prosecute current operations. This applies to both store and mill business and refers particularly to the last week in the month of April. Some interests report an awakening the opening days of May, particularly in the way of local business, a condition that is natural, as local buyers are wont to postpone the ordering of necessities from the last week of one month to the first of the next, in order to get the benefit of the 30 days billing. Pig Iron is dull, with a tendency to make concessions to secure what few desirable orders are going. This tendency is naturally more marked in the Northern than in the Southern field, because the methods of selling Northern and Southern Iron differ. Southern furnaces will sell a single car at the same price they would take a contract for 10,000 tons, while Northern furnaces make concession to the large tonnage buyers. Billets are now weaker than they were at our last report, which is not saying much. Standard Section Rails are quiet, with only one order of note. The demand for Light Section Rails is almost nil. Track Supplies are fairly active. Structural Steel is far behind what it should be this time of year, but no less than last week. Plates show a slight strengthening in tone. Sheets are much slower in demand than they should be at this season, with a disposition on the part of independents to cut prices to whatever figure is necessary to get the business. Pipe and Boiler Tubes are only fairly active. Cast Pipe is dull and weak. Old Materials have slumped off 50c. per ton on a dozen lines, with a weak tone pervading

the whole market. Metals are weak, with no changes in price. The Coke market in Chicago is suffering from the presence of large tonnages of Coke on track subject to demurrage. Wire products, while strong in comparison with other lines of Steel, are not what they were two weeks ago. This general dullness is taken by men well posted and experienced in the trade as being only temporary and hope is expressed that another week will see a decided change for the better. This has been a buyers' week.

Pig Iron.—Considerable apprehension is felt here that the untenable demands made by masters and pilots of lake vessels may result in a protracted tie up of lake navigation. The demands of the Captains' Association are taken by vessel owners to mean a surrender on the part of the owners of practically all voice in the control and management of their property, and for this reason the sentiment among Chicago vessel owners is that they prefer to have their vessels lie idle through the whole season rather than accede to the demands. A meeting is scheduled for Thursday of this week at Cleveland, at which some decided stand will be taken one way or another. Ice is breaking up on Lake Superior, and some vessels have already passed through the Sault. It is interesting in this connection to know that only four years during the last 100 years has navigation opened up as late as it has the present season. Pig Iron is decidedly weaker in tone, with a drop of 50c. in maximum prices on Northern Iron and the minimum price indeterminate. While there is all sorts of talk about Southern Iron being sold on the basis of \$9.75, Birmingham, for No. 2 Foundry, no documentary evidence is at hand to prove that such a cut has been made. Certain it is that the supply of Iron exceeds the demand, and that every prospective order is competed for by numerous interests. The cut on the maximum price of Northern Iron and the general weakness in the Northern market may be taken as an indication of a determination on the part of Northern furnaces not to permit the Southern interests to take away from them that tonnage of Iron that goes either North or South, according to the price advantage. In general it may be taken as an axiom that a certain percentage of Northern Iron will be bought by foundrymen and a certain percentage of Southern Iron, while a certain percentage goes either way, according to price. It is the practice of foundrymen, as is well known, to mix Northern and Southern Irons in order to secure a grade desired, and to combine with both in many cases as large a percentage of Scrap as is permitted by the character of casting that is to be made, or that is made advantageous by the saving accomplished by the use of Scrap instead of Iron. One lot of about 2500 tons of Nos. 1 and 2 Northern was sold to an implement concern at Racine during the week at a price that is not announced. There is but little present demand for Basic Iron in this market, and the price nominally remains on the \$10, Birmingham, basis. Standard Bessemer has lost 50c. of its last week's price. As indicated above, the prices below for Northern Iron represent the maximum, with a minimum depending upon the magnitude and desirability of the order. We quote:

Lake Superior Charcoal.....	\$15.00 to \$15.50
Northern Coke Foundry, No. 1.....	to 14.50
Northern Coke Foundry, No. 2.....	to 14.00
Northern Coke Foundry, No. 3.....	to 13.50
Northern Scotch, No. 1.....	to 14.50
Ohio Strong Softeners, No. 1.....	15.50 to 15.80
Ohio Strong Softeners, No. 2.....	14.80 to 15.30
Southern Silvery, according to Silcon.....	14.65 to 15.65
Southern Coke, No. 1.....	to 14.15
Southern Coke, No. 2.....	to 13.65
Southern Coke, No. 3.....	to 13.15
Southern Coke, No. 4.....	to 12.65
Southern Coke, No. 1 Soft.....	to 14.15
Southern Coke, No. 2 Soft.....	to 13.65
Southern Gray Forge.....	to 12.40
Southern Mottled.....	to 12.15
Malleable Bessemer.....	15.30 to 15.80
Standard Bessemer.....	15.80 to 16.30
Jackson County and Kentucky Silvery, 6 to 10 per cent. Silcon.....	16.80 to 18.30
Alabama Basic.....	13.65 to 13.90
Virginia Basic.....	14.60 to 14.85

Billets.—Small lots of 50 to 100 tons each of Forging Billets and Rolling Billets have been sold in this market during the week past, in most cases at association prices, with here and there a slight cut made by the minority independent interests. The activity of wagon manufacturers continues to call for good tonnages of Skein and Axle Billets. Prices are unchanged on the basis of: Forging Billets, 4 x 4 and larger, \$24 per gross ton, Chicago, in carload lots; Axle Billets and Billets smaller than 4 x 4, \$25.

Rails and Track Supplies.—The leading interest sold about 12,000 tons of Rails last week, of which the largest order was 6500 tons for a Southwestern railroad. The general business on Standard Section Rails may be said to be light and unsatisfactory. Bookings on Light Rails are extremely few. Prices on Rails and Track Supplies are unchanged, as follows: Standard Section Rails, \$28 per ton for 500-ton lots and greater; Light Rails, \$25 to \$27 per ton. Angle Bars are still quoted at 1.40c. to 1.50c. Spikes at 1.65c. to 1.75c., base, while Track Bolts have been reduced to 2.30c. to 2.35c., base, with Square Nuts, and 10c. to 15c. extra for Hexagon Nuts.

Structural Material.—Reports on the condition of the Structural Steel market from a variety of sources vary with the personal equation of the man or firm making the report. In general, it may be said that business is slow and unsatisfactory and considerably behind what had been hoped for, with here and there an exception in a man or firm who claim that they are securing a business that is highly satisfactory to them. There is still a great deal of unrest in the labor market and the disposition to delay the erection of buildings that are really necessary in the hope that better financial conditions may prevail or that lower labor and material cost may be secured. Prices are unchanged, both from mill and store, as follows: I-Beams and Channels up to and including 15 inches and Angles 3 inches on one leg and larger, 1.76½c., Chicago; Tees, \$1 per ton extra. Store prices on Structural are as follows: Angles, Beams, Channels and Zees, base sizes, 2c. to 2.10c.; Tees, 2.05c. to 2.15c., either random lengths or cut to lengths 5 feet and over.

Plates.—The slight improvement noted during the last few weeks has continued, although that does not mean that the Plate business is good by any means, as it has been so poor in the past that a vast betterment will be necessary to place the business on a basis satisfactory to the mills. A slight improvement is noted in orders from contract boiler shops, which have been extremely slow in their demands during the past few months. Prices are unchanged, as follows: Tank Steel, ¼-inch and heavier, 1.76½c.; Flange Steel, 1.86½c.; Marine, 1.96½c.; Universal Mill Plate, 1.76½c. to 1.81½c.; 3-16 inch Tank, 1.86½c.; Nos. 7 and 8, 1.91½c.; No. 9, 2.01½c.; No. 10, 1.91½c. to 1.96½c.; No. 11, 1.96½c. to 2.01½c.; No. 12, 2.01½c. to 2.06½c. Store prices are as follows: Tank Plate, 100 inches wide or less, ¼-inch and heavier, 2c. to 2.10c.; 3-16 inch, 2.10c. to 2.15c.; Nos. 8 and 10, 2.10c. to 2.20c.; Flange quality, 25c. per 100 lbs. extra.

Sheets.—Conditions on Sheets are unchanged. Association prices are being maintained with fair uniformity by the leading producer and by such independents as are in the Independent Sheet Producers' Association, but the cutting of prices from \$1 to \$3 per ton is still in evidence, particularly on narrow sizes made by small independent mills. It is a strange fact that while Sheet mills are crying for business they have still unfilled orders on their books back as far as last January, it being even more difficult now to secure delivery of specifications than it was in the days when mills were full of business, as the low prices being quoted make it necessary for mills to bunch their rolling orders in such a way as to secure a good run of each size. The fact that specifications are not as numerous as they were in good times makes it frequently necessary to wait months before other orders for combination with orders already received come in in sufficient volume to permit rolling orders to be placed with the mills for such odd sizes. Association prices are as follows: Nos. 9 and 10, 2.01½c.; Nos. 11 and 12, 2.06½c.; Nos. 13 and 14, 2.11½c.; Nos. 15 to 17, 2.16½c.; Nos. 18 to 21, 2.21½c.; Nos. 22 to 24, 2.26½c.; Nos. 25 and 26, 2.31½c.; No. 27, 2.36½c.; No. 28, 2.46½c.; No. 29, 2.56½c.; No. 30, 2.71½c. Store prices on Sheets, 16 gauge and heavier, have been revised and reduced, as follows: Nos. 8 and 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 14, 2.25c. to 2.35c.; No. 16, 2.30c. to 2.40c.; Nos. 18 and 20, 2.50c. to 2.55c.; Nos. 22 and 24, 2.55c. to 2.60c.; No. 26, 2.65c. to 2.70c.; No. 27, 2.75c. to 2.80c.; No. 28, 2.80c. to 2.85c.; No. 29, 2.95c. to 3c.; No. 30, 3.10c. to 3.15c. Galvanized Sheets are still quoted at from 80 to 80 and 5 discount, Pittsburgh, in car lots. Store prices on Galvanized Sheets remain unchanged at 75 and 7½ to 75 and 10 per cent. discount.

Bars.—It may be taken as a fact that the price of Bar Iron is now squarely 1.45c., base, half extras, Chicago, in carload lots. This means that the price at the mills ranges from 1.35c. to 1.42½c., according to the freight cost between the mill and Chicago, although quotations are not made ordinarily by the mills on the basis of these lower figures. The reduction of \$1 per ton in the price of Bar Iron has not materially increased the tonnage of orders received by the Iron mills, while it has reduced their profits or increased their losses just \$1 per ton. Steel Bars are in a different category from Iron, inasmuch as the interests producing them are able to hold the prices firmly without regard to the price on Iron. Steel is firm at 1.35c., mill, which makes 1.51½c., base, half extras, Chicago, in carload lots. Business in Bars is naturally dull because of the large tonnages placed before the recent advance, though specifications from implement and wagon manufacturers for Bars and Tire are highly satisfactory. The Hoop business is quiet, as is natural from the fact that the large buyers covered their requirements for a number of months just previous to the recent advance. The price remains unchanged at 1.40c. rates, full extras, Pittsburgh, or 1.56½c., Chicago. Store prices are unchanged, as follows: Iron Bars, 1.75c., base, full extras; Steel Bars, 1.70c. to 1.80c., base, half extras; Hoops, 2.10c. rates, full extras.

Merchant Steel.—Leading interests report that a satisfactory number of contracts from representative implement concerns for deliveries between July 1, 1904, and July 1,

1905, are being booked, but that present specifications on the part of implement concerns for quick delivery on this year's contracts are naturally slow, as the majority of such requirements have been met. Prices remain unchanged, as follows: Open Hearth Spring Steel to the general trade, 2c. to 2.25c.; Smooth Finished Machinery Steel, 1.76½c. to 1.81½c.; Smooth Finished Tire, 1.71½c. to 1.76½c.; Sleigh Shoe, flat, 1.56½c. to 1.61½c.; Sleigh Shoe, concave and convex, 1.66½c. to 1.71½c.; Cutter Shoe, 2.25c. to 2.35c.; Toe Calk Steel, 2.06½c. to 2.11½c.; Crucible Tool Steel, 6½c. to 8c.; special grades of Tool Steel, 13c. and up; Shafting at 52 per cent. in car lots and 47 per cent. in less than car lots.

Merchant Pipe.—The Pipe business is still good, but nothing like it was a month ago, when mills were crowded to their capacity. On the other hand, it is encouraging to note that the consumption of Pipe is increasing with the improving weather conditions that make building possible over a wider and wider area. Prices are unchanged, as follows:

	Steel Pipe.		Guar. Wr'ght Iron.	
	Black.	Galv.	Black.	Galv.
1/4 to 3/8 inch.....	Per cent. 66.35	Per cent. 56.35	Per cent. 64.35	Per cent. 54.35
1/2 inch.....	69.35	59.35	67.35	57.35
3/4 to 6 inches.....	73.35	63.35	71.35	61.35
7 to 12 inches.....	69.35	59.35	66.35	56.35
Less than carloads, 12½ per cent. advance.				

Boiler Tubes.—A barely noticeable increase of business is coming from contract boiler shops, which have been and still are below normal in their demand for Tubes. The prices quoted below are the discounts named by the leading producer for delivery at Chicago in carload lots, though independent interests are naming somewhat lower prices, particularly on Charcoal Iron Tubes. The official prices of the leading producer are as follows:

	Steel.	Iron.	Seamless steel.
1 to 1½ inches.....	43.35	40.80	53.35
1½ to 2½ inches.....	55.85	38.35	40.35
2½ inches.....	55.35	43.35	40.35
2½ to 5 inches.....	64.35	50.85	{ up to 4 in. 48.35
6 to 13 inches.....	55.85	38.35	

Agreed store discounts for delivery from store, Chicago, are as follows:

	Steel.	Iron.	Seamless steel.
1 to 1½ inches.....	40	35	37½
1½ to 2½ inches.....	50	32½	35
2½ to 5 inches.....	60	45	45
6 inches and larger.....	50	32½	..

Cast Iron Pipe.—With every softening of the Pig Iron market the buying movement in Cast Iron Pipe is relaxed, and for that reason the last week's business in Pipe has been relatively small. It is a noteworthy fact that Cast Iron Pipe buyers place their orders on an advancing market, and on an average throughout the year pay considerably higher than the minimum prices for their requirements. We repeat last week's quotations, as follows: \$27 for 4-inch Water Pipe, \$26 for 6 to 12 inch and \$25 for larger than 12-inch, with \$1 extra for Gas Pipe.

Old Materials.—The decline in prices of Old Materials continues, nearly half the items on the list being reduced this week about 50c. per ton compared with last week. These reductions include Old Steel Rails, Heavy Melting Steel Scrap, Railroad Wrought, Wrought Pipe and Flues, Machine Shop Turnings, Heavy Cast Scrap, Railroad and Agricultural Malleable. The leading buyer of Old Materials is practically out of the market for the present, and dealers are chary about loading up under present market conditions. The Illinois Central is offering about 1300 tons, the St. Paul 3000 tons and the Wisconsin Central and other roads smaller lots of about 500 tons each. Prices are about as follows, per gross ton:

Old Iron Rails.....	\$17.00 to \$17.25
Old Steel Rails, 4 feet and over.....	12.50 to 13.00
Old Steel Rails, less than 4 feet.....	11.00 to 11.50
Heavy Relaying Rails, subject to inspection.....	23.00 to 24.00
Heavy Relaying Rails, for side tracks..	18.00 to 20.00
Old Car Wheels.....	14.00 to 14.25
Heavy Melting Steel Scrap.....	10.00 to 10.50
Mixed Steel.....	9.00 to 10.00

The following quotations are per net ton:

Iron Fish Plates.....	\$13.50 to \$14.00
Iron Car Axles.....	17.25 to 17.50
Steel Car Axles.....	15.50 to 16.00
No. 1 Railroad Wrought.....	12.00 to 12.50
No. 2 Railroad Wrought.....	11.00 to 11.50
Shafting.....	13.50 to 14.00
No. 1 Dealers' Forge.....	9.25 to 10.00
Wrought Pipe and Flues.....	8.50 to 9.00
Iron Axle Turnings.....	8.50 to 9.00
Soft Steel Axle Turnings.....	8.50 to 9.00
Machine Shop Turnings.....	7.25 to 7.50
Cast Borings.....	4.50 to 5.00
Mixed Borings, &c.....	4.50 to 5.00
No. 1 Mill.....	7.75 to 8.25
Country Sheet.....	7.25 to 7.50
No. 1 Boilers, cut in Sheets and Rings.....	9.00 to 9.50
Heavy Cast Scrap.....	10.50 to 11.00
Stove Plate and Light Cast Scrap.....	9.00 to 9.50
Railroad Malleable.....	10.00 to 10.50
Agricultural Malleable.....	8.50 to 9.00

Metals.—Business is extremely dull, although the decided decrease in demand has not been of sufficient duration and prominence to affect prices thus far. We therefore repeat last week's quotations, as follows: Copper is unchanged but firm in price at 13½c. for Casting and 13¾c. for Lake; Pig Tin, 29½c. to 29.60c.; Pig Lead, 4.45c. for 50-ton lots, 4.60c. for car lots and 4.80c. to 4.85c. for small lots. Spelter has advanced to 5.20c. to 5.35c. Sheet Zinc has been boosted 30c. per 100 lbs., and is now quoted at 6.20c. in car lots, Chicago, made up of 600-lb. casks, and 6.45c. to 6.50c. on less than car lots. Old Metals are steady at previous prices. We quote: Copper Wire and Heavy, 11½c.; Copper Bottoms, 10½c.; Copper Clips, 10½c.; Red Brass, 10½c.; Red Brass Borings, 9c.; Yellow Brass, Heavy, 8½c.; Yellow Brass Borings, 6½c.; Light Brass, 6½c.; Tea Lead, 4c.; Zinc, 3½c.; Pewter, No. 1, 18½c.; Block Tin Pipe, 24c.

Coke.—The road of the Coke salesman in this territory is a thorny one, as prices are badly demoralized by the avalanche of Coke that has been received during the last two or three weeks as a result of the letting loose of the floodgates of transportation which had been closed during the months of February, March and particularly April. This Coke on track costs its owners \$1 per car per day for demurrage, and their desire to get out from under this accumulating cost leads them to offer extremely low prices. It is not impossible to buy 72-hour Foundry Coke on track, Chicago, as low as \$4 per ton, though in cases of this kind the buyer must not be too particular about the quality or analysis of the Coke. Ruling prices may be said to be from \$4.25 to \$4.80, Chicago, for 72-hour Foundry Coke, the wide divergence between low and high prices named depending upon the known value of the Coke.

The National Tube Company have moved their Chicago offices from the third floor of the Western Union Building to the eleventh floor of the Rookery.

The American Sheet & Tin Plate Company have moved their Chicago offices from the Marquette Building to the eleventh floor of the Rookery.

The Shelby Steel Tube Company have moved from the Western Union Building to the eighth floor of the Rookery, Chicago.

R. M. Cherrie & Co., dealers in Old Metals, have removed from the second floor to larger quarters on the third floor of the Western Union Building, Chicago.

The Cambria Steel Company and the Pennsylvania Steel Company, represented in the West by Clifford J. Ellis, have extended their offices on the second floor of the Western Union Building, Chicago, into rooms formerly occupied by the Emlen Iron Works and R. M. Cherrie & Co.

The Westinghouse Air Brake Company have moved from the seventh floor of the Rookery to the Railway Exchange Building, Chicago.

M. K. French of the firm of L. K. Hirsch & Co., the Rookery, Chicago, has been appointed sales agent for the State of Illinois for the chainless touring car built by the Reed Mfg. Company, Detroit.

The Chicago office of the Walter A. Zelnicker Supply Company, formerly in the Old Colony Building, having proved too small for their increasing business, the company have moved to a suite on the sixth floor of the Railway Exchange Building, located on the corner of Jackson boulevard and Michigan avenue. H. L. Schamberg is in charge.

Philadelphia.

FORREST BUILDING, May 2, 1904.

There is not much that need to be said in regard to conditions in the Iron and Steel trades, as they are practically the same as they were a week ago. Business may be a little duller and prices a shade easier, but beyond that there is no essential change. The question naturally arises, Why are all the markets so dull and why is there so little interest manifested in things? To answer this is like threshing old straw, but it ought to be answered in some way. The correct answer is that business is dull and apathetic because conditions are uncertain. If they were known to be distinctly bad, things would be worse than they are and prices would be lower. On the other hand, if they were known to be distinctly good, bargain hunters would be around and prices would easily advance. But as matters stand to-day business is neither good nor bad, and there is no means of knowing in which direction the next movement will be. There are influences on both sides which might lead to extraordinary conditions if they were not counterbalanced by others of an opposite character. Who knows whether crops are going to be good or bad, or whether the extraordinary financial conditions are going to be surmounted without serious disturbances or not? Who knows what the political conditions will be six months hence, or what complications may arise out of the war between Japan and Russia? Of course—and properly—it is assumed that these will all come out right in the long run,

but in the meanwhile they are pregnant with possibilities; and as there is already a feeling of uncertainty, if not of anxiety, it is no wonder that business hesitates until the outlook becomes clearer. For the time being, therefore, it will be futile to look for activity, and it may be a task of considerable difficulty to maintain even the *statu quo*.

Pig Iron.—The market is extremely dull, and under the circumstances it is surprising how well prices are maintained. The favorable feature is that furnaces are well sold up for May and June, so that there is no need for any immediate drop in prices. Beyond June there is no doubt that prices will be governed by the demand. There must either be a good deal of new business, or a good many furnaces must be blown out, otherwise overproduction will surely affect prices. This is what the trade are up against, but how it will turn out remains to be seen. There is no change from last week's prices, and it is by no means certain that the market is weak, although there can be no question as to its dullness. Fifteen dollars for No. 2 X Foundry appears to be as low as can be done, some stick to \$15.25 or better, but the volume of business is very small, so that there is some room for doubt what would be accepted on bids for large lots. The events of the week have been rather in favor of easier prices. Coke is lower than it has been since 1902, ores are lower, and as the demand is of an indifferent character, it is somewhat surprising that these influences have not been reflected in quotations, but so far they have not been felt. A fair average of to-day's prices would be about as follows for deliveries in buyers' yards, Philadelphia or nearby points:

No. 1 X Foundry.....	\$15.75 to \$16.00
No. 2 X Foundry.....	15.00 to 15.25
No. 2 Plain.....	14.50 to 14.75
Alabama No. 2, rail shipment.....	14.25 to 14.50
Alabama No. 2, on dock.....	13.50 to 13.75
Standard Gray Forge.....	13.75 to 14.00
Ordinary Gray Forge.....	13.00 to 13.25
Basic.....	14.00 to 14.10

Steel.—The demand has fallen to almost nothing, but this is believed to be only a temporary condition. The quotation is continued at \$25, delivered, on small lots.

Plates.—The demand is very disappointing, and work is not likely to be very abundant during the summer months. Some business is coming in all the time, but it is of a desultory character, and barely offsets the daily deliveries. There is plenty of work talked about, and which will no doubt materialize sooner or later, but it is the uncertainty as to time that checks any immediate buoyancy. Prices are unchanged, as follows:

	Carloads. Cents.	Part carloads. Cents.
Tank Steel, ¼ inch and heavier.....	1.73½	1.78½
Tank Steel, 3-16 inch.....	1.83½	1.88½
Tank Steel, Nos. 7 and 8, B. W. G.....	1.88½	1.93½
Tank Steel, Nos. 9 and 10, B. W. G.....	1.98½	2.03½
Flange or Boiler Steel.....	1.83½	1.88½
Commercial Fire Box Steel.....	1.93½	1.98½
Still Bottom Steel.....	2.03½	2.08½
Locomotive Fire Box Steel.....	2.23½	2.28½
Plates over 100 to 110 inches.....	.05 per lb. extra	
Plates over 110 to 115 inches.....	.10	
Plates over 115 to 120 inches.....	.15	
Plates over 120 to 125 inches.....	.25	
Plates over 125 to 130 inches.....	.50	
Plates over 130 inches.....	1.00	
All sketches (excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches).....	.10	
Complete Circles.....	.20	
Shell grade of Steel abandoned.		

Structural Material.—Business comes in dribs, a fair volume in the aggregate, but nothing to bank on for future operations. There is a great deal of work to be done, and it is somewhat probable that it will develop in the near future, but for the present it is a matter of faith and hope rather than reality. Prices unchanged: Beams, Channels and Angles, 1.73½c. to 1.85c., according to specifications, and small Angles, 1.50c. to 1.55c.

Bars.—The demand is much less active than it was two or three weeks ago, although as yet there is no real scarcity of work. But it is disappointing that new business develops so slowly, as at this season, if at all, mills should be piling up a considerable amount of work. Prices are unchanged, but the extreme figures are less in evidence than they were some time ago, and good business can be placed at about 1.5c. for either Refined Bar Iron or Soft Steel. Special qualities command a little more money, but 1.5c. is a fair average quotation.

Sheets.—Dull as can be, and for the season the movement is very light. The day to day demand is fairly active, but that appears to be about all that can be depended on for the present, as comparatively little provision is being made for later requirements.

Old Material.—This is the dulllest and the weakest end of the business at the present time. Supplies are increasing, while buyers are "back stepping" as fast as they can. It is impossible to give exact quotations, but the inside figures are about what would be paid, while the outside are what sellers ask. The feeling is very weak, although it is by no means cer-

tain that inside figures would meet immediate acceptance. Bids and offers are about as follows for deliveries in buyers' yards:

No. 1 Steel Scrap.....	\$13.00 to \$13.50
Low Phosphorus Scrap, nominal.....	17.50 to 18.00
Old Steel Axles.....	16.00 to 17.00
Old Iron Rails.....	17.25 to 18.00
Relaying Rails.....	21.00 to 22.00
Old Iron Axles.....	20.00 to 21.00
Old Car Wheels.....	12.00 to 13.00
Choice Scrap, R. R. No. 1 Wrought.....	17.00 to 18.00
Yard Scrap.....	14.00 to 15.00
Machinery Scrap.....	12.50 to 13.00
No. 2 Forge Fire Scrap.....	12.50 to 13.00
No. 2 Forge Fire Scrap (Ordinary).....	10.00 to 10.50
Wrought Turnings.....	10.00 to 10.50
Axle Turnings, Choice Heavy.....	11.00 to 11.50
Cast Borings.....	7.00 to 7.50
Stove Plate.....	11.00 to 11.50
Wrought Iron Pipe.....	12.00 to 12.50

Cleveland.

CLEVELAND, OHIO, May 3, 1904.

Iron Ore.—The Ore situation, as far as lake rates are concerned, has not changed in any material respect. The shippers, not being in any position to talk, have made no proposition on Ore rates. The vesselmen are talking about holding out for high rates, but are mostly concerned in straightening out some snarls which have occurred in the labor situation. The interlake channels are not yet free of ice, and the result is that the opening of the season of navigation seems a good while in future.

Pig Iron.—The situation in this territory has not been very good during the past week. The tendency among consumers is to wait for lower prices when Ore prices have been reduced. Foundry prices are holding steady for first half delivery at \$13.25 to \$13.50 in the Valleys. Southern producers are disposed to sell Iron in this territory, if possible, but are getting little business. They are holding for \$10, Birmingham. In the Basic trade there has been very little inquiry and hardly any business. It is apparent that some of the producers are in need of business and orders are desired, but the amount yet to be sold for first half delivery is not large. The market is at present properly represented by a quotation of \$13 in the Valleys either for spot or long time delivery. The Bessemer trade is very quiet at \$13, at the furnace. The Coke situation is considerably easier. Shipments are rapid. Prices hold at about \$2.25 to \$2.40 for good 72-hour Foundry Coke, with good furnace Coke ranging between \$1.50 and \$1.65, at the oven. We quote Pig Iron prices, f.o.b. cars Cleveland, about as follows:

Northern Coke, No. 1 Foundry.....	\$14.25 to \$14.50
Northern Coke, No. 2 Foundry.....	13.75 to 14.25
Northern Coke, No. 3 Foundry.....	13.25 to 13.50
Southern Coke, No. 1 Foundry.....	14.35 to 14.60
Southern Coke, No. 2 Foundry.....	13.85 to 14.10
Southern Coke, No. 1 Soft.....	14.35 to 14.60
Southern Coke, No. 2 Soft.....	13.85 to 14.10
Jackson County, 8 per cent. Silicon.....	16.50 to 17.00
Hanging Rock Charcoal, No. 1.....	23.45
Southern Charcoal, No. 1.....	19.50 to 20.00
Lake Superior Charcoal.....	16.50 to 17.00

Finished Iron and Steel.—The Finished Steel situation in this territory has kept pace with the general industrial situation throughout this district, being quiet in the main. The best buyers have been the agricultural implement works, but the possible failure of the wheat crop is just now having a dampening influence. There has been talk of weakness in Bar Iron and some business is known to have been covered at \$1 off the recently quoted prices. The amount of business done at that figure, however, hardly establishes a market. The quotation generally prevailing is 1.40c., Pittsburgh. The Steel Bar situation is firm, but not buoyant, the buying being light, although specifications against contracts have been steady. The price holds at 1.35c., Pittsburgh, for Bessemer. The Structural trade in this territory has been light. Two or three inquiries are of some importance. The city of Cleveland is planning to erect some municipal buildings, and other public contracts pending promise a fair amount of tonnage. In addition two or three buildings for commercial purposes have been planned. Big Plate buyers are holding off and only occasional orders relieve the dullness of the market. The bad outlook for fruit in this territory and the unfavorable weather conditions throughout have worked together to cause a light demand for Sheets. At times the independent concerns show a disposition to cut, and reductions of from \$1 to \$4 a ton on Black Sheets have been heard. Association prices have ruled, in the main, and are continued as follows: For No. 27 Black Sheets out of stock, 2.50c.; for the same gauge in one pass cold rolled in car lots at the mill, 2.25c. to 2.30c. Galvanized Sheets are sold 75, 10 and 5 off list for Nos. 16 to 20, while No. 22 and lighter are sold at 75, 10 and 7½ off list. The call for Light Rails has eased up materially. Standard Rails are being inquired for, but no buying movement has started. Prices hold at \$28, Pittsburgh, for Standard Rails and \$24 to \$25 for Light Rails.

Old Material.—The market has been extremely dull. Some of the grades show considerable weakness. Prices are continued, many of them being nominal, as follows, all gross tons: Old Steel Rails, \$13 to \$14; Old Car Wheels, \$13 to \$14; Heavy Melting Steel, \$13. All net tons: Cast Borings, \$5 to \$5.50; No. 1 Railroad Wrought, \$12.50 to \$13; No. 1 Busheling, \$11 to \$11.50; Wrought Turnings, \$7 to \$7.50; Iron Car Axles, \$18; No. 1 Cast, \$11 to \$12; Stove Plate, \$9.

Pittsburgh.

PARK BUILDING, May 4, 1904.—(By Telegraph.)

Pig Iron.—The dissolution of the Ore Association and open prices this year on Ore will probably have a very quieting effect on the Pig Iron market. The independent Ore producers were unable to adjust their differences at the meeting in Cleveland on Tuesday and decided to abandon all attempts to continue the Ore Association this year. The United States Steel Corporation took the position that they would not buy any Ore from outside producers, and agreed to mine only sufficient Ore to meet their own requirements. They also agreed to the reduction in prices, but there were other points that could not be arranged, and it is a matter of regret that the Ore Association has been dissolved. There is practically nothing doing in Bessemer Iron, the nominal price of which is \$13, Valley, but on a firm offer this would probably be shaded. Foundry Iron is lower in price and is held at \$12.40 to \$12.50, Valley, or \$13.25 to \$13.35, Pittsburgh. Forge is nominally \$12.75, Pittsburgh, but is weak at that price, with little or no demand.

Steel.—There is not much new tonnage being placed in Steel, and should there be any material decline in price of Bessemer Pig it may be necessary to readjust prices of Billets and Bars on a lower basis. The fairly active demand for Sheets and the very heavy demand for Tin Plate are taking the output of Sheet and Tin Bars about as fast as made, and some of the Sheet and Tin Plate mills are having trouble in getting Bars as fast as needed. We quote Bessemer and Open Hearth Billets at \$23; Long Sheet and Tin Bars, \$24, and Cut Sheet and Tin Bars, \$24.50, all f.o.b. Pittsburgh.

(By Mail.)

The closing of negotiations for the purchase of Clairton Steel Company is the only item of interest. The contract for Billets, made by the Crucible Steel Company with the Steel Corporation, is not on a sliding scale, as generally supposed, based on the price of Bessemer Pig Iron, but the price to be paid for these Billets will be arranged each month between the Crucible Steel Company and the Steel Corporation, the Crucible Company paying a certain percentage under the market price for Billets. Based on present prices of Bessemer and Open Hearth Billets, the cost to the Crucible Steel Company would be between \$20 and \$21, delivered. The acquiring of a half interest in the Ore properties of the Clairton Steel Company by the Steel Corporation gives the corporation a considerable tonnage of Ore, and this was one of the most valuable assets of the Clairton Company. The two blast furnaces and Open Hearth plant of the Clairton Steel Company are now being operated on account of the Steel Corporation, but the formal transfer of the properties will not be made until May 20. In the meantime, the various officials of the Clairton Company will resign and arrangements will be made by the Crucible Steel Company to pay the indebtedness of the Clairton Company, which amounts to about \$1,750,000. We understand that the creditors of the Clairton Steel Company are to be paid in 6, 12 and 18 months' notes of the Crucible Steel Company without interest.

Matters in the Iron trade are extremely quiet and it is claimed that the situation is duller to-day than at any time in the early part of the year, but this is probably stretching it a little. At the same time it is a fact that demand for all kinds of Iron and Steel is quiet, with the exception of three or four lines, notably Tin Plate, Pipe and Wire products, demand for which is good, but not as heavy as in the latter part of March and early in April. The nominal price of Bessemer Iron is \$13, Valley, but there is not enough moving to fix a market. The only sale of Bessemer Iron of any note made in this market for more than a week was about 2000 tons sold to the Crucible Steel Company recently at a price equal to about \$13.85, Pitts-

burgh. Basic Iron is quiet and could be bought readily at \$12.50, Valley furnace. Some low prices are being made on Foundry Iron, Northern No. 2 having sold recently as low as \$12.40, Valley, or \$13.25, Pittsburgh. Northern Gray Forge is held at \$12.50 to \$12.75, Pittsburgh. The demand for Finished Iron and Steel is of a hand to mouth character, buyers seeing no incentive to contract, but are placing orders only for actual needs. Plates are especially dull in demand. To save demurrage there have been some resales of Furnace Coke recently at comparatively low prices. The Scrap market is extremely dull, all kinds of Old Material having gone off more or less in price. It is the general opinion that the next three or four months in the Iron trade will be quiet.

Ferromanganese.—There is practically no inquiry for Ferro, and we quote 80 per cent. domestic at \$41.50 in large lots and \$42 in small lots, delivered. We hear of sales of English Ferro at very low prices for delivery at points near seaboard. One such sale was at less than \$40, delivered, with an inland freight of 60c. a ton.

Muck Bar.—There is absolutely no demand for Muck Bar and prices are very weak. We quote nominally at \$25 to \$25.50, f.o.b. Pittsburgh, but on a firm offer our lower price might be shaded.

Wire Rods.—There is very little inquiry for Rods, the larger consumers being pretty well covered for some time ahead. The mills are still somewhat behind in delivery of Rods, but we do not hear of any new tonnage having been placed for some time. We quote Bessemer and Open Hearth Rods at \$30.50 to \$31, Pittsburgh.

Skelp.—Prices on Skelp are fairly firm, but very little new tonnage is being placed. We quote Grooved Iron Skelp at 1.40c. to 1.45c.; Sheared Iron Skelp, 1.50c. to 1.52½c., and Grooved and Sheared Steel Skelp at 1.35c., all f.o.b. Pittsburgh.

Steel Rails.—As yet the expected orders for Rails from the leading roads have not been placed. It is claimed there are inquiries in the market for a good deal of tonnage, but these have not resulted in actual business. Recently several railroad officials have expressed themselves as strongly opposed to paying \$28 a ton for Rails, and insist that the price must be reduced before the mills can reasonably expect any large contracts. We quote Standard Sections at \$28, at mill. Low prices continue to be made on Light Rails, a recent sale of 35-lb. Sections having been made at \$21.50, at mill. The general schedule on Light Rails is \$23 for 25 to 45 lbs., \$24 for 16 to 20 lbs., \$26 for 10 to 12 lbs. and \$28 for 8-lb. Sections.

Structural Material.—No large contracts have been placed since our last report. The Lake Shore road is in the market for some bridge work and the Chicago & Northwestern has also placed some tonnage. It is evident, however, that railroad requirements this year will be smaller than usual. A good many small jobs are coming in which aggregate a fair tonnage. Additional departments of the Ambridge works of the American Bridge Company are being started. There is no change in prices and we quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.60c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c.

Plates.—The demand for Plates continues dull and the outlook is not encouraging by any means. The car shops are placing very little tonnage and the general trade is buying from hand to mouth. We quote: Tank Plate, ¼-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.60c., at mill, Pittsburgh; Locomotive Fire Box, not less than 2.10c., and it ranges in price up to 3c. Plates more than 100 inches in width, 5c. extra per 100 lbs. Plates 3-16 inch in thickness, \$2 extra; gauges Nos. 7 and 8, \$3 extra; No. 9, \$5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days.

Sheets.—The unevenness in price of Sheets noted in our last report is more pronounced, and is no doubt due to the 18 per cent. reduction in wages made recently. It is said that some contracts for Sheets placed some time ago have been readjusted on a lower basis. Demand for Sheets is fairly active, the leading interest operating about 75 per cent. of its capacity. We quote: No. 26 Black Sheets, box annealed, one pass through cold rolls, 2.05c. to 2.10c.; No. 27, 2.10c. to 2.15c., and No. 28, 2.20c. to 2.25c., f.o.b. at mill, for carload lots. Galvanized Sheets are held at 2.85c. for No. 26, 3.04c. for No. 27 and 3.23c. for No. 28, in carload lots, for ordinary specifications. For large tonnage and attractive sizes these prices would be slightly shaded. Jobbers charge the usual advances over above prices for small lots from store.

Bars.—Tonnage in Iron and Steel Bars is only moderate, but is not as heavy as two or three weeks ago. The official price of 1.35c. on Steel Bars is being firmly held, but prices of Iron Bars are slightly weaker, a few of the mills being apparently anxious for business and are disposed to shade prices to get it. Specifications on contracts are not coming in as rapidly as desired. We quote Iron Bars at 1.35c. to 1.40c., Pittsburgh, and Steel Bars at 1.35c., Pittsburgh, in carload and larger lots, with the usual differentials for less than carloads. On Open Hearth Bars \$1 a ton advance is charged.

Hoops and Cotton Ties.—The demand for Steel Hoops is only fair, and we quote these at 1.40c., Pittsburgh, and Steel Bands at 1.30c. to 1.35c., extras as per Steel card. Most of the tonnage in Cotton Ties for this year delivery has been placed and the mills are now working on these contracts.

Merchant Pipe.—The advent of good weather is already being felt in a better demand for Merchant sizes in Pipe, tonnage in the past week having shown a considerable increase. In the smaller sizes demand is quite good, and the leading Pipe mills are pretty well filled up for this and next month. A number of important oil and gas lines are projected, and, if put through, will require considerable tonnage. Prices are fairly firm, but our discounts are sometimes slightly shaded. Pittsburgh basing discounts to consumers in carloads are as follows:

Merchant Pipe.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
1/4, 1/2 and 3/4 inch.....	68	58	66	56
1/2 inch.....	71	61	69	59
3/4 to 6 inches.....	75	65	73	63
7 to 12 inches.....	71	61	68	58
Extra strong, plain ends, 1/2 to 8 inches.....	67	57	64	54
Double extra strong, plain ends, 1/2 to 8 inches.....	59	49	56	46

Boiler Tubes.—We note a moderate demand for Boiler Tubes, but the railroads are buying very sparingly, tonnage from this class of consumers being much lighter than usual. There is some unevenness in prices, some of the mills shading our quotations more or less, depending on the order. Official discounts to consumers in carloads, which, however, are shaded 5 per cent. or more by some of the mills, are as follows:

Boiler Tubes.

	Steel.	Iron.
1 to 1 1/4 inches.....	42 1/2	39
1 1/4 to 2 1/4 inches.....	55 1/2	38
2 1/4 inches.....	58	43
2 1/4 to 5 inches.....	64 1/2	50 1/2
6 to 13 inches.....	55 1/2	38

Merchant Steel.—Tonnage in April showed a considerable falling off as compared with the previous month. Specifications on contracts are not coming in as fast as the mills would like. Demand for high grade Tool Steels is reported by several mills to be quite active. We quote: Hexagon Steel Bars, 1.60c. for Bessemer and 1.65c. for Open Hearth; Plow Steel, 6-inch and under, 1.40c. for Bessemer and 1.45c. for Open Hearth; Plow Slabs, 3/4-inch and heavier, 1.65c.; Tire Steel, smooth finish, 3/4 x 3-16 and larger, 1.65c. flat; Toe Calk, 1.90c.; Carriage Spring Steel, 1.75c. The demand for Shafting is fairly active, and we quote at 52 per cent. off in carloads and 47 per cent. in less than carloads delivered in base territory.

Tin Plate.—The slight wage trouble in some of the Tin Plate mills referred to last week has disappeared. Demand for Tin Plate is very active and all the mills of the leading interest are being operated to utmost capacity. The independent mills are also very busy and consumers of Tin Plate who have contracts placed are having trouble in getting prompt deliveries. We quote 100-lb. Coke Terns at \$3.40 per box, f.o.b. Pittsburgh.

Spelter.—Prices on Spelter have weakened further and Prime Western grades are now offered at 5.13 1/2c. to 5.15 1/2c., f.o.b. Pittsburgh, for prompt shipment.

Iron and Steel Scrap.—The Scrap market is excessively dull and practically no tonnage is moving. Heavy Melting Scrap is freely offered at \$13, Pittsburgh, without finding buyers. The Clairton Steel Company, the leading consumers of Heavy Scrap in this district, are filled up for the next several months. We quote Old Steel Rails at \$13 to \$13.25 in gross tons. No. 1 Wrought Scrap is \$12.50 to \$12.75 in net tons. Re-rolling Rails are \$14.75 to \$15 in gross tons. Prices on all kinds of Scrap are merely nominal, not enough material being sold to fix a market.

Coke.—Some resales of Furnace Coke, to save demurrage charges, have recently been made at low prices. The supply of cars is plentiful and this has a tendency to weaken prices of Coke. Demand for Foundry Coke is quiet and strictly Connellsville 72-hour is held at \$2 to \$2.15 a ton at oven. Best Connellsville Furnace Coke is held at about \$1.60 a ton at oven, but there have been some resales at \$1.50 a ton or lower.

Birmingham.

BIRMINGHAM, ALA., May 2, 1904.

It is a very difficult matter to say anything of special interest concerning the Iron market. In one sense of the term things are at "sixes and sevens" and the market seems to be running itself. While apparently there seems to be but little interest manifested in the market, still there are certain signs that foretell a coming change. The market can't remain in the condition it is at present for any length of time. We are certainly on the eve of a change of values; and that man is wise who can tell whether the change will be to higher or lower values. Transactions were limited the past week and prices were variable. As was the case the preceding week, the close of the week showed a better inquiry, but it developed no business of significance.

There was a feeling of the market for the lower grades particularly (that could not be supplied), by some large interests, but it resulted in no business and the would-be buyers withdrew disappointed at their failure to uncover the grades they wanted. The fact is that while there is a very moderate amount of those grades on hand they are not owned by the furnace interests, but by consumers who will take them when delivery is matured. Some of the interests which were fortunate enough to be able to supply Iron carrying certain analyses had some business at very favorable prices. But it was in extent not great enough to make any of them wealthy. For these orders buyers paid a premium. Some lots of this class of Iron went at prices that were equal to \$10.40 for No. 2 Soft, and some went at \$10.50 for that grade. There was also a sale of 200 tons of No. 2 Foundry, special analysis, at \$10.75; and, in one case, there was a sale of 130 tons at \$10.85. Some doubting Thomas will be inclined to doubt these figures, but they are matters of record. Even better than these figures has been done, as No. 1 Foundry was sold at \$11 and some No. 2 Foundry went at \$10.50. Some of these sales were reluctantly accepted, for they require special handling and special care. They must fulfill conditions to a nicety and it takes an inducing price to command their consideration. In some cases the Iron had to carry at least 3 per cent. Silicon, and in other cases some other element at a certain per cent. was required.

The prices were acceptable, but the volume of business was very moderate. The price quoted as being for straight grades included only small lots and were from small buyers, whose needs are supplied at monthly intervals. While these sales were being made at the prices quoted, there were sellers of Iron on the basis of \$10 for No. 2 Foundry who were not burdened with business. It was one of those cases where the seller who wanted business was sidetracked in favor of the one who was not seeking it. There was some selling of No. 2 Foundry at \$10, but no amount of significance. One order of 2000 tons was accepted and one for 1000 tons was put through. The preceding week there were three sellers of Iron on the basis of \$10 for No. 2 Foundry, and this price was continued by them the past week without material business. In fact, it was a very quiet week in the Iron trade.

Basic Iron is still held at \$10, with practically no business doing in it. It is a hard matter to quote No. 3 Foundry. It is being priced by some at \$9.50, while some who hold it in limited supply, would, at present, accept nothing less than \$9.75. Information from buying markets of prominence is to the effect that it can be had on a basis of \$9.25, Birmingham, but the statement has no weight here in the face of the fact that it is held in very moderate supply. The condition of the market is tersely expressed when we say it is a waiting market. Every Iron man is fully imbued with the knowledge that but a moderate degree of activity would clean up the furnace yards in less than a week, and they look for the necessary activity to do this before the end of this month. In the meantime attention is mainly directed to preparing for delivery of the Iron already sold, and there will be cases where lapses in delivery will occur. Shipments are still quite free and there is no loss of time in getting the Iron away as fast as deliveries mature.

The Pipe interests report again very favorably concerning business. They are still pretty well filled up with business and are having more thrust upon them. With some there is no effort being made to secure new business. Prices have stiffened some for 6-inch Pipe and the larger sizes. The base price is now \$23 and some business is being taken.

At the Steel mill they appear to have whipped in their fight with the discontented element among their labor, as they have secured a sufficient supply to make them independent of their action. There is some revival of the talk of another Steel mill in this district, but it does not come from men who have the money to build it. That the subject is being considered in a tentative way there is little doubt, and it is equally certain that no definite conclusions have been arrived at concerning it.

Developments of properties are constantly going on and this applies particularly to coal properties. By the time the next coal season rolls around the problem will be to find the market for all we can mine.

There has been a change in the administration of the affairs of the Sheffield Iron & Coal Company. Wm. Eden-

born has resigned the presidency and Mr. Peckitt of the Empire Steel & Iron Company succeeds him. No statement has yet been made of any change in the policy of the company.

The Industrial Finance & Trust Company of this city, acting as fiscal agents, have concluded a transaction involving the purchase of 2000 acres of mineral lands in Marion County. The purchase has been turned over to the Reid's Gay Oil, Gas & Mining Company. The land is said to carry a fine quality of coal, besides showing richness in gas and oil prospects. The same parties have acquired an interest in similar property in Clay County and announce their intention to develop both properties.

Among the new industries that are secured, we can mention the Steam Stone Works of Reed Brothers, who have completed their plant and are prepared to accept orders. It is the only plant of the kind here of any moment and was very much needed.

Cincinnati.

FIFTH AND MAIN STS., May 4, 1904.—(By Telegraph.)

Pig Iron.—There is scarcely anything to be noted in this market that can be regarded as interesting. It is severely quiet, and the general tone indicates less strength and activity than has prevailed for some time. There have been some small lots sold, but the tonnage is so slight, compared with what was expected, that it cuts but a very small figure in the way of volume. The Pipe companies apparently are very busy, while the foundries and other consumers of the higher grades of Iron are exceedingly quiet. To-day is the date set for the letting of bids for about 30,000 tons of Pipe for the new plant of the Cincinnati Water Works. It is understood that fully one-half of this amount will require a much better test of tensile strength than is ordinarily used in making these Pipes. There is no doubt but that there is plenty of Iron to be had on a \$9.75, Birmingham, basis; in fact, one very large Southern interest has to-day openly promulgated these figures. The outlook is not very promising, and sellers who have thoroughly canvassed the situation regard it as far from satisfactory. Freight rates from Hanging Rock district to Cincinnati, Ohio, \$1.15, and from Birmingham, \$2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$13.00 to \$13.25
Southern Coke, No. 2.....	12.50 to 12.75
Southern Coke, No. 3.....	12.00 to 12.25
Southern Coke, No. 4.....	11.50 to 11.75
Southern Coke, No. 1 Soft.....	13.00 to 13.25
Southern Coke, No. 2 Soft.....	12.50 to 12.75
Southern Coke, Gray Forge.....	11.50 to 11.75
Southern Coke, Mottled.....	11.25 to 11.50
Ohio Silvery, No. 1.....	16.15 to 16.40
Lake Superior Coke, No. 1.....	14.15 to 14.40
Lake Superior Coke, No. 2.....	13.65 to 13.90
Lake Superior Coke, No. 3.....	13.15 to 13.40

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	\$17.00 to \$17.50
Lake Superior Car Wheel and Malleable	17.00 to 17.50

Coke.—The Coke market is showing very little strength and demand is quite limited. Prices have dropped a shade lower, with a plentiful supply on hand. We quote, f.o.b. ovens: Connellsville, \$1.75 to \$2.

Plates and Bars.—Prices are holding firm, with very little buying movement in evidence. Structural Iron, which at this season of the year usually is in great demand, is quiet, with nothing in sight to occasion any change for the better. We quote, f.o.b. Cincinnati: Iron Bars, in carload lots, 1.40c., with half extras; the same in smaller lots, 1.70c., with full extras; Steel Bars, in carload lots, 1.48c., with half extras; the same in smaller lots, 1.80c., with full extras; Base Angles, 1.73c., in carload lots; Beams and Channels, in carload lots, 1.73c.; Plates, ¼-inch and heavier, 1.73c., in carload lots; in smaller lots, 2c.; Sheets, 16-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; 14-gauge, in carload lots, 1.95c.; in smaller lots, 2.50c.; Steel Tire, ¾ x 3-16 and heavier, 1.68c., in carload lots.

Old Material.—The mills are quiet and dealers are unable to dispose of their stock, even with prices shaded. There is practically no demand and a state of stagnation prevails. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Railroad Wrought Scrap, \$11 to \$11.50 per net ton; No. 1 Cast Scrap, \$9.25 per net ton; Iron Rails, \$14.50 per gross ton; Steel Rails, rolling mill lengths, \$11 to \$11.50 per gross ton; Iron Axles, \$15 per net ton; Car Wheels, \$11 to \$11.50 per gross ton; Heavy Melting Scrap, \$11.50 per gross ton; Low Phosphorus Scrap, \$11.50 to \$12 per gross ton.

It is understood that Neville Priestly, Under Secretary to the Government of India, who came to this country to study methods of railroading with the view of adopting them in building roads in India, has recommended the purchases of railroad equipment to be made in the United States. Mr. Priestly inspected the principal railroad systems, and his report contains many valuable observations from an expert's point of view.

Labor Notes.

A machinists' strike is in prospect in Chicago, members of the Machinists' Union employed in many shops throughout the city having voted to demand an increase of 2 to 5 cents an hour.

An edict was issued May 1 by the International Association of Machinists ordering all their men in the employ of the Atchison, Topeka & Santa Fe Railroad Company to walk out on May 2. The negotiations for an adjustment of the differences failed, President Ripley insisting before he would sign the schedule that the association give a guarantee safeguarding the company in the event any union in the association did not abide by the schedule. This was refused. At Albuquerque, N. M., on April 29, owing to the strike of the shopmen, the company secured a sweeping injunction against all striking employees, restraining them from interfering with agents or employees of the road, from delaying or impeding the movements of trains and from entering on the company's property or right of way. It is the most radical order of the kind ever issued by a court in that Territory. Official information from the railroad company is to the effect that their determined stand in negotiations preceding the present trouble served to destroy the force of the strike ordered; that only 42 machinists are out on the Oklahoma and Southern Kansas divisions and the Western Grand division; that only 46 machinists are out on the Gulf, Colorado & Santa Fé, covering 1500 miles of line; that the San Joaquin Valley men struck, but their places have been filled, and the large number of unemployed machinists, boiler makers and blacksmiths is solving the difficulty of replacing the strikers. Not one of their shops is entirely closed down, and some are running with a full force of men.

The carriage and wagon makers went on strike in New York on May 2, as had been threatened. The strike is due to the refusal of the employers to sign a wage scale and recognize the union. The employers refuse absolutely to recognize the union, saying that it is impossible to establish a wage scale in the business. The skill required in the different branches and the methods are too varying to permit this.

The boiler makers employed by the Boston & Albany division of the New York Central Railroad at Springfield, Mass., have gone on strike because two of their number were discharged for a violation of shop rules.

The right of manufacturing companies to operate their plants with non-union workmen is being upheld by repeated decisions of the courts in Western Pennsylvania. The striking employees of the Phoenix Iron Works Company, Meadville, Pa., were, on April 29, enjoined from "interfering with the efforts of the proprietors of the plant to secure new workmen." The striking employees of the Rochester Tumbler Company, Rochester, Pa., are also under an injunction not to interfere with the operation of the plant.

The Norway Iron & Steel Company's plant at York, Pa., was closed last week for an indefinite period. The suspension is due to a strike of the molders against a 10 per cent. reduction in wages.

The strike of the Amalgamated Association at the Harrisburg Rolling Mills, Harrisburg, Pa., is still in force. The company will not recognize the union, and are not anxious to bring the strike to an end, as orders are at present at a very low ebb.

ALONZO W. PORTER, treasurer of the Brown Wire Gun Company, died April 28, at his apartments in the Grand Central Hotel, New York. He was born in Williamstown, Mass., and had been engaged in business in New York since his youth. The development of the Brown wire wound gun, for which an appropriation of \$700,000 has just been made by the Government, was largely due to his efforts.

New York.

NEW YORK, May 4, 1904.

Pig Iron.—The volume of business originating in this immediate vicinity has been very small, and the market has been exceedingly quiet. The tunnel contract went to two distant foundries, one at Wheeling and one at Buffalo, so that the metal will not be covered from furnaces tributary to this market. It is figured that the price for the Tunnel Lining Castings went at something like \$24 per ton, which is exceedingly low for a machined Casting. The market for Southern Iron is weaker. We continue to quote: Northern No. 1 Foundry, \$15.50 to \$16; No. 2 Foundry, \$15 to \$15.50; No. 2 Plain, \$14.50 to \$14.75, and Gray Forge, \$13.75 to \$14, tidewater. Tennessee and Alabama brands are quoted \$13.75 to \$14 for No. 2 Foundry and \$13.25 to \$13.50 for No. 3 Foundry.

Steel Rails.—We note sales of Standard Rails during the past 10 days aggregating 75,000 tons, the purchasers being trunk lines, coal roads, a New England and Western lines. We continue to quote \$28, at mill, for Standard Sections.

Cast Iron Pipe.—Current business is without special feature. No important lettings are at present in sight in this immediate locality. Manufacturers report the continued receipt of small orders, which are sufficiently numerous to keep their order books in good condition. Prices are unchanged, carload lots being quoted at \$28 per gross ton for 6 to 10 inch and \$27 for 12-inch upward, at tidewater. Large lots command special prices.

Finished Iron and Steel.—In the experience of the American Bridge Company April proved a better month than March had been. The company's sales for the month averaged considerably over 1000 tons a day. Most of the work now coming out is for buildings, the railroad demand still failing to develop anything of importance. The largest local contract in the structural line placed during the past week was one for a building in Jersey City which will require 1800 tons, secured by an independent contractor. Very much to the gratification of local business interests, the opening days of this month have passed without any labor trouble of any consequence in the building trades. The way now appears to be clear for contractors to undertake the erection of buildings without much fear of interruption from this cause, but capitalists are disposed to wait in the hope that they may be able to secure building material at cheaper rates. The Plate trade shows no change from the inactive condition which has so long prevailed. The immediate outlook is not encouraging, as labor troubles have broken out afresh in shipyards and boiler shops, thus diminishing the prospect of much demand from such trade. Bar Iron manufacturers report their order books comfortably filled, but new business is less active and reports are current of some shading of prices. The threatened strike in the wagon and carriage shops of this city went into effect on Monday, and from appearances is likely to continue for some time, as employers express a strong determination not to yield to the demands made upon them. We quote, at tidewater, as follows: Beams, Channels, Angles and Zees, 1.74½c. to 2c.; Tees, 1.79½c. to 2c.; Bulb Angles and Deck Beams, 1.84½c. to 2.05c. Sheared Plates in carload lots are 1.74½c. to 1.85c. for Tank, 1.84½c. to 2c. for Flange, 1.94½c. to 2.10c. for Marine and 1.94½c. to 2.50c. for Fire Box, according to specifications. Refined Bar Iron and Soft Steel Bars, 1.49½c.

Old Material.—The market is very quiet. Consumers seem well supplied, and dealers are unable to effect sales, except at sharp concessions. The confidence which was creeping into the trade with the opening of spring disappeared almost before it could be said to have attained much development. Railroad companies that two months ago were firmly holding their accumulations of Old Material are now accepting the best offers made them, eagerly endeavoring to convert such accumulations into cash, evidently believing that it is useless to wait for better conditions. Prices are quoted as follows, per gross ton, New York and vicinity:

Old Iron Rails	.....	\$16.00 to \$16.50
Old Steel Rails, long lengths	.....	13.00 to 13.50
Old Steel Rails, short pieces	.....	12.00 to 12.50
Relaying Rails	.....	18.00 to 19.00
Old Car Wheels	.....	11.50 to 12.00
Old Iron Car Axles	.....	16.00 to 17.00
Old Steel Car Axles	.....	14.00 to 15.00
Heavy Melting Steel Scrap	.....	12.00 to 12.50
No. 1 Railroad Wrought Iron	.....	14.00 to 15.00
Iron Track Scrap	.....	13.50 to 14.00
Wrought Pipe	.....	10.00 to 10.50
Ordinary Light Iron	.....	7.00 to 7.50
Cast Borings	.....	4.50 to 5.00
Wrought Turnings	.....	7.00 to 7.50
No. 1 Machinery Cast	.....	11.50 to 12.00
Stove Plate	.....	9.50 to 10.00

Negotiations between the Brotherhood of Boiler Makers and the New York Metal Trades Association for a new working agreement for this year have come to an end, and the riveters in many of the shops and local shipyards have gone out. The point upon which the confer-

ence split was the maintenance of the open shop, which was insisted upon by the organization of employers.

United States Steel Corporation's New Officers.

At the regular monthly meeting of the directors of the United States Steel Corporation held May 3 at 71 Broadway, New York, officers were elected for the ensuing year. Henry Phipps was elected a member of the Finance Committee in place of Charles M. Schwab, whose term of office had expired. The resignation of Francis H. Peabody of Kidder, Peabody & Co. as a director was accepted. and Robert Winsor, his partner, was elected in his place. Mr. Peabody resigned because of ill health. George W. Perkins was re-elected chairman of the Finance Committee and Henry H. Rogers was also re-elected a member. The full membership of the Finance Committee is now as follows: George W. Perkins, chairman; Henry H. Rogers, Norman B. Ream, Peter A. B. Widener, Henry C. Frick, Robert Bacon, Henry Phipps, Elbert H. Gary, *ex-officio*; William E. Corey, *ex-officio*.

The directors re-elected the following officers for the ensuing year: Elbert H. Gary, chairman of the board; William E. Corey, president; James Gayley, first vice-president; William B. Dickson, second vice-president; Francis Lynde Stetson, general counsel; Richard Trimble, secretary and treasurer; William J. Filbert, comptroller.

The by-laws of the corporation were amended by changing the date of the monthly meetings of the board from the first Tuesday of the month to the last Tuesday of the month. The reason for the change is that, under the by-laws, as they previously existed, the question of dividends was considered on the first Tuesdays of April, July, October and January, for the quarters ending with the months of March, June, September and December. This necessitated action based on an estimate of earnings for the last month of the quarter. The change in the by-laws will give opportunity to ascertain the exact figures before the day of the meeting of the board.

The Chapman Iron, Coal & Coke Company.

The Chapman Iron, Coal & Coke Company have been incorporated with a capital stock of \$3,000,000 for the purpose of consolidating the various interests of the parties who own the Chapman Coal & Coke Company, who have extensive coal mines and coke ovens in the New River district, West Virginia, on the line of the Chesapeake & Ohio Railroad. The company have purchased Victoria Furnace at Goshen, Va., from the Allegheny Ore & Iron Company, which has been out of blast for about six months. It is their intention to overhaul the stack and put it in blast as soon as the necessary improvements can be made. An electric ore handling plant and other modern machinery will be installed. Victoria Furnace has an annual capacity of 50,000 tons, and will be operated for the production of foundry iron. The company will also operate iron mines at Rich Patch, near Low Moor, Va., and limestone quarries at Craigsville, Va. The company will have their main offices in New York, probably at 80 Broadway, where the office of the temporary president, M. D. Chapman, is now located.

The Mark Mfg. Company.—The Mark Mfg. Company, Chicago, who have purchased the tube works at Zanesville, Ohio, formerly owned by the Eastern Tube Company, are preparing to put the plant in operation, and will make black and galvanized merchant pipe in all sizes from ½ to 16 inches in diameter, gas and oil line pipe, boiler tubes, casing, tubing and drive pipe for well purposes. They have appointed C. E. Corbett and W. M. Starr to represent them in the sale of oil country supplies, with offices in 1325 Park Building, Pittsburgh.

Mrs. Hibbs, wife of Jos. S. Hibbs, assistant general manager of the J. W. Paxson Company, died on April 1, at St. Joseph's Hospital, Philadelphia, after a short illness. Mrs. Hibbs was well known among the foundrymen of the United States, having traveled extensively with her husband, and accompanied him at times to the annual meetings of the different foundry associations.

Metal Market.

NEW YORK, May 4, 1904.

Pig Tin.—Following a relapse into weakness at the close of last week, the Tin market revived on Monday on the strength of a sharp rise in London, and the publication of the monthly Metal Exchange Statistics, which were regarded as more favorable than was expected. The movement of Tin into consumption, however, has continued comparatively light, although some increase in inquiries is noted and speculative transactions were more in evidence. While current consumption is undoubtedly very large, the country seems to be well supplied with the metal through the heavy arrivals of last month. This accounts for the slow demand at present. The market at the close to-day was quiet and rather easy, with spot and May quoted at 27.95c. to 28.10c., and June at 27.50c. to 28c. The London market was slightly higher for spot at £127 15s., but futures have declined 10 shillings, to £126 5s. The monthly Pig Tin statistics as compiled by C. Mayer, secretary of the New York Metal Exchange, are as follows:

Deliveries into consumption were large, amounting to 3900 tons. The total for the first four months of this year shows a decrease of 1400 tons, as compared with the same period of last year.

The combined deliveries of London and Holland for April were 202 tons larger than last year. For the first four months of this year the increase is 568 tons, as compared with the same period of last year.

Shipments from the Straits for April were 2177 tons larger than for the same month of last year. For the first four months of this year the increase amounts to 1822 tons, as compared with the same period of last year.

Australia shipped 124 tons less in April, as compared with the same month of last year. The total increase for the first four months of this year amounts to 2 tons, as compared with the same period of last year.

The total visible supply on April 30 was 2283 tons below that of April 30 of last year.

Statistics for the United States, Pacific ports excluded, April 30 show as follows:

Stocks, including on dock and arrivals.....	Tons.
Afloat	1,402
Total	4,024

Below we give the total statistics for Europe and the United States, showing:

Total visible supply April 30, 1904.....	Tons.
Against visible supply March 31, 1904.....	13,695
Against visible supply April 30, 1903.....	15,662
Against visible supply April 30, 1903.....	15,978

Copper.—The market continues firm, but buying during the week was on a very limited scale, and the export movement was much below the level of earlier months. Consumers are still unconvinced of the stability of present prices and continue their hand to mouth policy in buying. The market at the close was steady, but dull. Prices are unchanged, as follows: Lake, 13.37½c. to 13.62½c.; Electrolytic, 13.12½c. to 13.25c.; Casting, 12.87½c. to 13.12½c. The London market has declined a shade, to-day's cables quoting £58 6s. 3d. for spot and £58 5s. for futures; Best Selected, £63 5s. The total exportation for the month of April aggregated 13,567 tons, showing a heavy falling off in volume as compared with previous months of the year. The total exports of Copper since January 1, 1904, exclusive of Southern ports for April, was 82,577 tons, as against 46,024 tons in the corresponding period of 1903. During the month of April following arrived at New York, Baltimore and Philadelphia by steamers only:

From Europe, Copper.....	Tons.
Mexico, Copper.....	501
Spain, Ores.....	1,515
Cuba, Ores.....	13,760
	2,235

Pig Lead.—Demand is not active, purchasing being on a rather light scale and confined almost wholly to spot, which is still rather scarce. The market at the close was more or less easy, but with prices unchanged. Spot is quoted in New York, from store, at 4.60c. to 4.65c. The American Smelting & Refining Company continue to quote on a basis of 4.50c. for 50-ton lots of Desilverized, shipment within 30 days. Shipments can be had for 4.50c. St. Louis telegraphs 4.40c. to 4.42½c. London cables to-day show a decline to £11 18s. 6d.

Spelter.—With a moderate demand and no pressure to sell, Spelter is fairly firm. Spot and May shipments are quoted at 5.20c. to 5.25c., New York. Shipments from the West are offered at 5.20c. St. Louis is easy at 5c. to 5.05c. London cables £22 7s. 6d.

Antimony.—A light demand is noted and the market is unchanged. At the close to-day Cookson's was quoted at 7¼c. to 8c., Hallett's at 7¼c. to 7½c., and other brands at 6¼c. to 6½c.

Nickel.—The usual amount of business is passing and prices are firm, large lots being quoted at 40c. to 45c. and smaller quantities at 50c. to 60c.

Quicksilver.—The market is quiet, with ample stocks and a demand of moderate proportions. Flasks of 76½ lbs. are quoted at \$45. The London price to-day is £8 2s. 6d.

Tin Plate.—Contract shipments from the mills are heavy and a fair tonnage of new business is being placed.

Local jobbing houses report some increase in the demand with the coming of milder weather. Quotations are very firm, on the basis of \$3.45 per box for 14 x 20 100-lb. Cokes, f.o.b. mill, equivalent to \$3.64, New York. The Welsh market has advanced 1½ pence to 11 shillings 9 pence, f.o.b. Swansea.

Iron and Industrial Stocks.

Transactions in industrial stocks during the past week have been comparatively unimportant, and only a few stocks have shown fluctuations of any consequence. Among the features of the week particularly worthy of comment was a break in the price of Tennessee Coal & Iron stock on Friday, for which no special reason was given except a mere surmise that the proposed consolidation of Southern pig iron makers is not so likely to be accomplished as seemed possible some time since. United States Steel stocks showed alternate periods of weakness and strength. Tennessee Coal & Iron ranged for the week between 35 and 37; United States Steel common between 10 and 10½, preferred between 54¼ and 56½, and the new 5 per cent. bonds between 76¼ and 77½. The bonds sold this week with semiannual interest off down to 73, thus failing to hold the price of last week. Last sales of active stocks up to 1.30 p.m. on Wednesday were as follows: Car & Foundry common 17½, preferred 70; Locomotive common 18½, preferred 81¼; Colorado Fuel 31; Pressed Steel common 26½, preferred 71½; Railway Spring common 19, preferred 73; Republic common 6½, preferred 42½; Sloss-Sheffield common 38, preferred 84; Tennessee Coal & Iron 35½; United States Steel common 10½, preferred 55½, new 5's 73.

The Pittsburgh Coal Company.—The mortgage for \$25,000,000 issued by the Pittsburgh Coal Company of Pennsylvania, the holding company of the Pittsburgh Coal Company of New Jersey, was filed in Pittsburgh last week. This explains the issue and sale of the bonds of the company to the amount of \$25,000,000 to the Pittsburgh Trust Company. It covers all of their coal lands, valued at \$70,000,000, and located in two States, the division being about 160,000 acres in Allegheny, Westmoreland, Washington and Fayette counties in Pennsylvania and 11,000 acres in the Hocking Valley district of Ohio. In all there are 1186 pieces of property included in the general blanket mortgage, which also covers all of the mine machinery, railroad cars and equipment. The amount realized from this mortgage will enable the Coal Company to fund the floating indebtedness and generally place the finances in good shape.

A departure from the popular policy of publicity has been made by the directors of the Pressed Steel Car Company, who last week held their quarterly meeting for the declaration of dividends, but refrained from issuing the statement of the company's business, which has heretofore been a feature of the dividend declarations.

Dividends.—Pressed Steel Car Company have declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable May 24, and 1 per cent. on the common stock, payable May 31.

The Neacy-Read Investment Company, Milwaukee, Wis., have been organized to hold real estate, to construct and operate a railroad and to conduct a general manufacturing and mercantile business, with a capital stock of \$50,000, divided into 500 shares. The incorporators are members and officers of the Filer & Stowell Mfg. Company in Milwaukee, who have formed this association for the purpose of holding the title to the various real estate and manufacturing properties of the manufacturing company. The Filer & Stowell Company are at present engaged in the erection of a very large new plant in the southern part of the city.

The Waterbury Clock Company, Waterbury, Conn., have the foundations completed for a new building, 42 x 114 feet, five stories, which will be used for general manufacturing purposes. Their new engine and boiler rooms are ready to receive their equipment. A compound Corliss engine will be installed, direct connected to a 2600-ampere Crocker-Wheeler generator. The boilers have not been decided upon.

The plant of the Structural Steel Car Company, Canton, Ohio, was sold at auction on Saturday, April 30. W. C. Lablin, acting for the Canton Bridge Company, bought the building and real estate for \$29,250. C. E. Thomas of the Cleveland Punch & Shear Works bought the machinery and personal property for \$6851. Both of the above named concerns are creditors.

The Philadelphia Machinery Market.

PHILADELPHIA, May 2, 1904.

There have been no developments of special interest in the Philadelphia machinery market during the past month; compared with March, about the same volume of business has been done. In some lines trade has improved, while in others the advances gained during the previous month were lost in April. With some manufacturers there appear to have developed more or less regular periods of activity and depression, which average, on the whole, a fair amount of business only. "Busy," as the term was understood during 1902, is practically an unknown quantity in this territory. Some plants still have old orders on hand, which keep them more or less actively employed, others are receiving enough day to day business to keep them moderately busy, and still others, and these are not a few, are operating their plants with reduced forces, or running only four or five days a week. New business comes in slowly, and it is the opinion of many that there will be no rush of orders for some months, but rather that a fair amount of business will continue to be placed from time to time during the spring and summer, no radical improvement being looked for until after the fall elections. Presidential year depression seems to have its influence in many ways, and business that would naturally have been placed before this has in instances been deferred indefinitely. Most of the orders placed during the past month have been for small lots, principally for a single tool or machine, buyers in most cases taking only what is absolutely needed for present requirements, and not in view of making extensions to their equipment.

Inquiries have varied, both in tone and quantity. In some instances the usual shopping around inquiry has been largely in evidence, while in others the tone has been good, and has promptly led to business. In some lines inquiries have materially increased, and in others conditions have been just the reverse. Estimating departments are busy in many establishments, preparing plans for future work, which too often is apt to be finally deferred. Some manufacturers say if 5, 10 or 20 per cent. of the inquiries developed into actual business, it would not take long to have their several plants running full of work.

Deliveries on almost all classes of machinery and tools can be made promptly. On standard machine tools of the medium and smaller classes, and in some cases even heavy standard tools, deliveries can be made directly from warehouse. Manufacturers can also, as a rule, make very good delivery on special tools, as castings and other material entering into their construction can mostly be made promptly.

There is little change in the foreign demand. As far as machinery and machine tools are concerned, there has been practically nothing coming to the local manufacturers. In pneumatic tools considerable business has developed from Germany, while other special lines have not gained any particular strength, the demand being if anything weaker. Some considerable locomotive business, however, is anticipated in the near future.

Iron and steel castings are in good supply. Some foundries, however, seem favored with more work than others, but deliveries of both gray iron and steel castings can be made promptly. Some foundries are said to want work very badly, and are willing in cases to shade prices in order to close a good contract. The labor question in the foundry is still an unsatisfactory one, difficulties being reported in several instances in this territory.

Machinery dealers have had a variable month. After a dull period in the early part, some merchants closed quite a good volume of business during the last two weeks, bringing the average up to a fair amount. Floors are well stocked, however, and immediate delivery can be made on most lines of tools.

The smaller engine and boiler trade has somewhat improved, particularly in the former lines. The breaking of winter, permitting of installations in this line, has resulted in placing increased business. Machine shop supplies are only in fair demand, reflecting the inactivity of the various machine shops.

Prices are practically unchanged. List prices and authorized discounts are reaffirmed and maintained by many manufacturers. There are cases, however, when competition is close, where extra discounts have been allowed, and these

extras are frequently a factor in the final placing of an order.

The Victor Talking Machine Company, Camden, N. J., whose plant was recently destroyed by fire, have secured temporary quarters in the old Ruby watch factory, Delaware and Penn streets, in that city. Such machinery as was not destroyed by the fire will be installed and used temporarily, until the old plant can be rebuilt and equipped. The work of rebuilding will be begun as soon as insurance has been adjusted and plans prepared.

The Standard Pressed Steel Company, manufacturers of the American Pioneer pressed steel shaft hanger, have recently appointed Patterson, Gottfried & Hunter, Limited, New York City, selling agents for New York and the New England States, and the Simonds Mfg. Company, Limited, New Orleans, La., selling agents for the Gulf States. They advise us that there has been a very good demand for their new hanger, and a number have been shipped to various parties, including an export order to Australia.

Edwin Harrington Son & Co., Incorporated, are removing from the old quarters, Fifteenth street and Pennsylvania avenue, to the new building which they have recently completed at Seventeenth and Callowhill streets. The new plant is commodious, and will better enable them to meet the demand for their various tools and appliances.

The Keystone Machine Tool Company, successors to Fred'k H. Gliem & Co., manufacturers of machine tools, located at Eleventh street and Ridge avenue, will during the month remove to Ninth and Westmoreland streets, where quarters have been secured.

Manning, Maxwell & Moore, who have recently opened machinery warehouses at 721-723 Arch street, report conditions favorable for future business. These parties are devoting 10,000 square feet of floor space to the display of machine tools of all kinds, heavy tools being particularly noticeable, and they have taken a number of satisfactory orders during the past month. The demand covers the whole range of machine tools, nearly all the requirements, however, being for single tools.

Thos. H. Dallett & Co., Incorporated, have had a good demand during the past month for their line of stone working tools—particularly stone surfacing machines—and a number have been shipped to various parties. The demand for general machine and pneumatic tools is, however, weak, but sufficient business comes in from day to day to keep the shop fairly busy.

The Espen-Lucas Machine Company continue fairly busy. Inquiries are quite plentiful, but do not develop into orders very rapidly. They have recently shipped a new special floor boring machine, which will cover an extra wide range of work, and a number of smaller bar saws to various parties. Deliveries have also been made of a number of rail cutting-off saws.

The demand for special railway shop tools, H. B. Underwood & Co. inform us, has been more or less irregular for several months, but, on the whole, averages fairly good. Large specifications are few, the bulk of the business being made up of smaller ones. A good order, however, was recently taken for railway shop tools, from parties in Montreal, Canada. Shipments, comprising one or more tools, have been made to various railroads throughout the country.

I. H. Johnson, Jr., & Co. have been receiving a fair share of business during the past month. Inquiries have been good, but orders do not result promptly. The demand has been largely toward medium sized lathes, and a number of these, together with some of the smaller size, have been shipped to customers in different sections.

Dienelt & Eisenhardt keep fairly busy in the machine department, but a falling off has been noted in the foundry. The demand for dead stroke hammers has increased, but a decrease is noted in the demand for hydraulic jacks. Shipments of a number of hammers of different sizes have been made to various parties during the past month. Delivery of a special flanging machine has also been made to parties in England.

Lovegrove & Co., Incorporated, find an increased demand for boilers and engines, and have made estimates for a number of installations. Inquiries are good, and some nice orders are in prospect. Recent installations include a 1000 horse-power Corliss engine for the new plant of the Quaker City Rubber Company, at Wissanoming, Philadelphia, and a 130 horse-power Corliss engine for the Hires Turner Glass Company, also of this city.

The Falkenau-Sinclair Machine Company have had a busy month. Inquiries have been rather frequent, and of a tone which indicates early business. While orders have not been as numerous as last month, the total has been satisfactory. Presses have been in good demand, and a number have been shipped to various parties, including several for the Frankford Arsenal, in this city. A special portable shaper and milling machine has also been delivered to the Niagara Falls Power Company, Niagara Falls, N. Y. There has been a good demand for testing machinery, and considerable work of this class is in sight.

The Philadelphia Pneumatic Tool Company are quite busy, orders for pneumatic tools during the past month being greater than for both February and March together. A large

amount of this business has been for export, Germany taking by far the largest number of tools. A good number of orders have also come from the domestic structural shops and for shipyard use. The Pacific Coast has been well represented in orders for various tools. Arrangements have been made by this company whereby Samuel Caskey, patentee of the Caskey punch and riveter, will take charge of the engineering department of the plant. They will also take up the manufacture of the new Caskey pneumatic and hydraulic punch and riveter. Some large shipments of pneumatic tools recently include deliveries to the Buckeye Steel Casting Company, Columbus, Ohio; Gould Coupler Company, Depew, N. Y.; Bullock Electric Company, Cincinnati, Ohio, and Westinghouse, Church, Kerr & Co., New York. The tools shipped the latter parties will be used on constructional work of the new power house for the Pennsylvania Railroad tunnel in that city.

The American Pulley Company are fairly busy. While inquiries and orders are quite as numerous as last month, the total sales will not aggregate as much. With a weak demand the dealers in pulleys, &c., do not carry as large a stock as under usual conditions. Export orders continue to be received, and deliveries have been made both to Australia and New Zealand. The requirements of the New England States and the South are not as large as they were, but good shipments are being made to parties in the Middle and extreme West.

The Link-Belt Engineering Company received some good orders for conveying machinery and coal storage plants during the past month. The Delaware, Lackawanna & Western Railroad ordered for their Truesdale breaker, near Scranton, Pa., an open top carrier for run of mine coal from the mine to the breaker. This arrangement is a duplicate of one installed at No. 14 Breaker of the Pennsylvania Coal Company, at Plains Junction, Pa. Its capacity is 500 tons per hour, and the coal is carried, not scraped as in other types, which means less friction, wear and tear, &c., on the plant and obviates jamming or breaking down. This carrier is to be 330 feet long. A reciprocating feeder supplies each bucket of the carrier with a regular and proper load. Orders for coal storage plants include a 5000-ton locomotive coaling station at Macon, Ga., for the Georgia Central Railroad, it being the fourth plant of the kind installed for that company. Coal handling machinery will also be installed in the Christian street wharf and the Sansom street power house of the Philadelphia Rapid Transit Company in this city. General orders, the Link-Belt Company say, have continued fairly good; in special lines, however, the past month has showed considerable improvement and conditions generally are looked upon more favorably.

The J. W. Paxson Company are erecting six No. 3 86-inch shell Paxson-Colliau cupolas, complete with lining, at the Altoona plant of the Pennsylvania Railroad Company, and have installed a No. 2 cupola at the Navy Yard at Norfolk, Va. A new Paxson-Colliau cupola and a rumbling outfit are also being installed for the Buckwalter Stove Company, Royersford, Pa. The Paxson Company have recently purchased the patterns and patents of the Hawley malleable iron flask clamp, and will manufacture and place these goods on the market. They have recently entered a contract for a large quantity of steel molding sand for export to Newport, Monmouthshire, Wales, and will ship it in cargo lots, various grades of sand being included in the contract. They also find a good demand for a new steel cement, which they are manufacturing and placing on the market under the name of Paxson fill-in steel cement.

The Baldwin Locomotive Works have during the past month received orders which will about equal the total for March, many of the railways still withholding their orders for engines. There is a good prospect, however, for some foreign business in the near future, a number of small orders already being in hand. While the plant is not as busy as it has been, there is still considerable work under way, and conditions favor a gradual betterment. A large amount of general locomotive repair work has also been recently taken, some of the railway repair shops being so crowded that they are unable to keep up on repairs to motive power. Recent deliveries of locomotives include shipments to the Baltimore & Ohio and a number of Western and Southern roads. A number of engines for the Philadelphia & Reading Railway are nearing completion.

The Energy Elevator Company have had a good month's business. The demand both from out of town and local sources has been better than during March. Some recent deliveries of elevators include a power freight elevator to Burlington, Vt., and a freight lift for the New Jersey Training School, Vineland, N. J. A special fire curtain hoist is to be installed in the Grand Opera House in this city. Other deliveries of freight elevators have been made to St. Louis, Mo.; Brattleboro, Vt.; Medford, Del.; Spokane Falls, Wash., and Urbana, Ohio.

The Otto Gas Engine Works have, it is said, decided to remove their plant from this city to Wilmington, Del. A tract of 57 acres is to be purchased in South Wilmington, and buildings suitable for their work are to be erected. Ground will be broken in a short time, and the work of building will be rapidly pushed.

The New York Machinery Market.

NEW YORK, May 4, 1904.

The machinery trade has been very quiet this past week, there having been no large orders nor any great amount of small ones booked. Up to Tuesday morning there were no further developments of the large projects which have "hung fire" for so long, but on that day the O'Rourke Engineering Construction Company, New York, virtually contracted for the iron castings for the Pennsylvania Railroad tunnel under the North River, thereby closing a deal which has been followed up very anxiously by the trade for months, as it will necessitate the early purchase of a quantity of additional machine tools.

The contracts, which call for 52,000 tons of tunnel castings and 12,000 tons of cast screw piles, have been virtually let, one-half thereof going each to the Wheeling Mold & Foundry Company, Wheeling, W. Va., and to the New York Car Wheel Company, Buffalo, N. Y. It is understood that the Wheeling company were the lowest bidders and that the Buffalo company met the price. The Wheeling company have had pledged to them by a meeting of citizens of Wheeling additional capital to the extent of \$250,000, while the Buffalo company, the old Griffin works, are backed by a large guarantee by the Berry interest of Detroit, which acquired the plant from the receivers some time since. It is reported that the successful bidders were fully \$200,000 below the others, whose figures were in the vicinity of \$27.50 for the castings and \$36 for the screw piles. There is no doubt that the work went at a very low figure.

It is thought that no two companies can produce this large amount of finished castings profitably without greatly increasing their facilities, especially their machine tool equipment, as there is a vast amount of machine work to be done, the specifications, originally issued by the Pennsylvania Railroad Company, requiring each casting to be machined true. In this connection it will be interesting to note that there are yet to be purchased 2000 tons of steel castings and a large quantity of miscellaneous iron castings for use in building the North River tunnel. Now that the material for the construction has been arranged for, it is thought that the O'Rourke Company will give their attention to the mechanical equipment for doing the work, and for the latter it is expected some nice orders will be shortly given out. It will be remembered that specifications were issued early last month for an enormous amount of various equipment, but as yet no important purchases have been made.

As to the East River section of the tunnel, there have been no further developments.

Since the contracts were given out for the construction of the tubes under the North and East rivers there has been considerable speculation as to whether it was the intention of the Pennsylvania Railroad to construct the land sections themselves. We are officially informed that the tunnel on the land section across Manhattan Island will be done by contract, but will not be given out for some time to come. The construction of this section will also mean the consumption of an immense amount of steel, and will necessitate the purchase of a large amount of machinery. As work can be done more rapidly on land, it is probable that the river sections will be well under way before anything will be done toward the building of the connecting tubes.

In addition to the 300-foot extension which the Bullock Electric Mfg. Company intend building to their No. 2 machine shop, several other enlargements are planned by this company for their Cincinnati plant. As we have previously noted, the extension to shop No. 2 will be equipped with light machine tools, principally for the manufacture of steel car motors. It has now been decided to add about 300 feet to shop No. 3, the heavy machine shop. This building will be equipped with heavy machine tools of various types applicable to the building of electric generators, to be connected to the steam turbines which will be built by the Allis-Chalmers Company at their West Allis plant. These two new shops will require about \$150,000 worth of machine tools. It has also been decided to build a large four-story structure opposite their recently acquired foundry, to be fitted with wood working machinery for pattern making. Part of the structure will be used for pattern storage. The lists of machinery required for all of this work have not been prepared as yet, but the company are receiving data from the machinery builders preparatory to the compilation of the lists. Bids for the construction of the buildings are now being received. Two of the Allis-Chalmers-Bullock turbo-generators are now in operation at the Cincinnati plant, and they are being tested very thoroughly. One is a 1500-kw. machine, running at 1800 revolutions, and the other is about a 1000-kw. set, running at 1200 revolutions per minute. Both machines are to be exhibited at St. Louis.

The Canadian Bullock Electric Mfg. Company, Lachine Locks, Quebec, who recently acquired the plant of the defunct Cooper Company, expect in the near future to install some additional machinery, including punches and shears.

It will probably be six months before anything can be

done in the way of preparing plans and specifications for the proposed new high pressure salt water pumping stations to be erected in New York for fire protection, as the departments who will have the work in charge will have to be organized and other formalities gone through which are required by law. Mayor McClellan has not yet signed the measure, though there is no doubt that he will at his leisure, as he was one of the earliest advocates of the bill.

As soon as their new plant is completed the Meade Roofing & Cornice Company, Philadelphia, Pa., will purchase the necessary sheet metal and cornice working machinery for equipping the buildings. The company have let the contract for the erection of the buildings, which will be of brick and stone, and located on the Philadelphia, Wilmington & Baltimore Railroad, at Forty-fifth street and Linmore avenue. The main building will be 60 x 205 feet; the office building, 45 x 60 feet, and the smaller buildings, 22 x 284 feet. An improved system of kerosene oil fire pots will be used and the machinery will be operated by electric motors, using the city's current.

The Shelby Spring Hinge Company, Shelby, Ohio, having recently moved their factory into larger quarters, and needing considerable new machinery and factory supplies, are desirous of receiving catalogues from manufacturers or dealers in the commodities mentioned.

Max Echelmann, 116 West Sixty-ninth street, New York, is in the market for brick making machinery, which he wishes to secure for parties in Mexico, who purpose to erect a brick plant in that country.

Considerable machinery will be required by the Vermont Marble Company, 217 West 125th street, New York, who have let the contract for a three-story brick plant, 40 x 125 feet, to be erected at Twelfth avenue and 133d street. The company are not yet ready to take up the matter of mechanical equipment.

In the annual report of the General Electric Company attention is called to the fact that they have sold about 350,000 horse-power of Curtis turbines, of which 35,000 horse-power have been installed and are in successful operation. The company have extensively enlarged their shops at Schenectady, N. Y., and Lynn, Mass., to take care of their turbine business, but have not as yet purchased the equipment. The Niles-Bement-Pond Company are building 13 special boring and turning mills for this work at a cost of \$150,000, and it is expected that they will soon be ready for shipment.

The following are the bids opened at the Bureau of Yards and Docks, Navy Department, Washington, on April 23, for the turbo generator, motors, &c., for the New York Navy Yard: General Electric Company, Schenectady, N. Y., item 1, \$47,447; 2, \$3947.

Westinghouse, Church, Kerr & Co., 10 Bridge street, New York, N. Y., item 3, \$54,000.

The mechanical and mining engineering firm of W. E. Hall and H. A. Keller have moved from the eighth floor to more commodious offices on the seventh floor, 30 Pine street, New York.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until May 24 for the following supplies for the Portsmouth, Boston, New York, League Island and Pensacola navy yards:

Class 1. One portable hydraulic press of 100 tons capacity with pump, oil tank, cylinder and gauge complete.

Class 2. One pattern and core box machine.

Class 3. One 25-inch and 50-inch swing pattern maker's gap lathe.

Class 4. One duplex hydraulic pressure pump to be furnished complete on existing foundations.

Class 5. One 18-inch standard pattern engine lather, 19 1/4-inch swing and 8-foot bed.

Class 6. Three pumps complete with engine and motor capacity 3000 gallons, 3500 gallons and 2000 gallons, respectively.

Class 7. One cold saw cutting off machine, direct electrically driven complete with motor.

Class 8. One hand planer and joiner.

Class 9. One heavy planer and smoother.

Class 10. One scroll saw complete.

Class 11. One saw bench, cut off, automatic, complete.

Class 12. Two universal saw benches.

Class 13. One universal saw bench.

Class 14. One band saw, 36-inch wheel, complete, with belt and countershaft.

Class 15. One single surface planer.

Class 16. One hand planer.

Class 17. One universal boring machine, single spindle, complete.

Class 18. One emery grinder, complete, one grindstone, mounted.

Class 19. One 3-foot sheet metal power press or brake, electrically driven, with suitable gear, complete.

Class 20. One wire crimping machine, electrically driven, complete, with suitable motor direct current, 110 volts.

Class 21. One 6 by 61 inch triple back geared slip roll forming machine, electrically driven, complete with suitable motors.

Class 22. One 18-inch slitting shear.

Class 23. One 6-inch gap punch.

Class 24. One brace, angle, tee iron, and tire bender.

The following bids were opened April 26 for supplies for the various navy yards:

New York.

Bidder 6. Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.

10. Shepherd Engineering Company, Franklin, Pa.

18. Thresher Electric Company, New York.

23. J. H. Johnson, Jr., & Co., Philadelphia, Pa.

26. General Electric Company, Schenectady, N. Y.

37. C. & C. Electric Company, New York.

43. Crocker-Wheeler Company, Ampere, N. J.

Class 1. Three generating sets and spare parts—Bidder 37, \$19,690; 43, \$20,379 and \$20,154.60; 18, \$20,474; 26, \$20,684.65 and \$21,284.65; 10, \$21,251; 6, \$23,022.80.

Class 2. Twenty generating sets—Bidder 26, \$900; 23, \$1219.

Portsmouth, Boston and New York.

Bidder 1. Arlington & Curtis Mfg. Company, Saginaw, Mich.

2. Niles-Bement-Pond Company, New York.

5. Hendy Machine Company, Torrington, Conn.

6. Heine Safety Boiler Company, St. Louis, Mo.

7. Crocker-Wheeler Company, Ampere, N. J.

8. Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.

9. Erie Foundry Company, Erie, Pa.

10. Prentice Bros. Company, Worcester, Mass.; informal, no guarantee.

11. Babcock & Wilcox Company, New York.

12. Bement, Miles & Co., Philadelphia.

13. Alliance Machine Company, Alliance, Ohio.

14. General Electric Company, Schenectady, N. Y.

15. Hanlon-Buck Mfg. Company, St. Louis, Mo.

16. New England Motor Company, Lowell, Mass.

17. Holtzer-Cabot Electric Company, Brookline, Mass.

18. Sprague Electric Company, New York.

19. D'Olier Engineering Company, Philadelphia.

20. Western Electric Company, New York.

21. Fairbanks, Morse & Co., Chicago.

23. Greer-Clarkson Company, Manheim, Pa.

24. Manning, Maxwell & Moore, New York.

25. Motley, Green & Co., New York.

26. Fairbanks Company, New York.

27. Sterling Company, New York.

28. Fox Bros. & Co., New York.

29. Doubleday-Hill Electric Company, Pittsburgh.

31. Altman & Taylor Machinery Company, New York.

32. Thresher Electric Company, New York.

33. Prentiss Tool Supply Company, New York.

34. Sterling Blower & Pipe Mfg. Company, New York.

Class 2. One 24-inch engine lathe—Bidder 33, \$1209; 24, \$1238; 26, \$1240 and \$1300; 2, \$1370; 5, \$1420.

Class 3. One electrically driven deck winch—Bidder 23, \$2081.50.

Class 4. Seven 20 horse-power shunt motors—Bidder 18, \$2891; 32, \$2940; 8, \$3255; 21, \$3262; 19, \$3486; 17, \$3500; 14, \$3556; 29, \$3563; 7, \$3731 and \$3556; 16, \$4725.

Class 5. Three hundred and fifty pound single frame steam hammer—Bidder 26, \$499; 15, \$500; 28, \$515; 12, \$580; 3, \$597; 9, \$620; 24, \$657.

Class 6. One shop saw—Bidder 2, \$39.50; 33, \$43; 24, \$48; 28, \$48.52.

Class 7. Two water tube steam boilers—Bidder 25, \$14,375; 31, \$14,738.83; 6, \$15,020; 27, \$15,380; 11, \$16,531.

Class 8. Exhaust system for handling shavings—Bidder 34, \$3460; 1, \$3833.

Catalogues Wanted.—The Ornamental Iron Works, A. F. Jorss, proprietor, Washington, D. C., are enlarging their plant and rearranging their catalogues, and would be pleased to receive any catalogues, price-lists, discount sheets, &c., from the trade.

The American Society of Mechanical Engineers, who will meet at Chicago on May 29, will afterward visit the St. Louis World's Fair, and thence go to Cincinnati, where the local members of the society are making elaborate preparations to extend to them every courtesy. The membership in Cincinnati numbers 35. The several committees have been arranged and the date set for about June 8, at the pleasure of the visitors. The committees who have the matter in charge are as follows: Entertainment, Messrs. Lane, Norris and Hobart; finance, Messrs. Lodge, Doan and Egan; hotels and advertising, Messrs. Smith, Le Blond and Goodman.

Winthrop L. Marvin of Boston has been appointed secretary of the Merchant Marine Commission, created by recent act of Congress.

HARDWARE.

FOR the first time in the history of the trade the catalogue house question is to be publicly discussed in its relations to the interests of those who make and distribute Hardware. For years there has been on the part of retail merchants individually and in their organized capacity a recognition of the character and effects of this form of competition, and efforts, somewhat intermittent and desultory, have been put forth in opposition to the disturbing methods which have introduced new and troublesome elements into the business. The associations of retail merchants which now exist in so many States have with remarkable unanimity declared against the demoralization which has been connected with the catalogue house business and have as opportunity presented brought the matter to the consideration of the jobbing trade and manufacturers. All this, however, attracted little attention. The editorial treatment of the subject in *The Iron Age*, coupled with the publication of a strong letter from a leading jobbing house and the resulting discussion, have brought the matter to the forefront, so that it now commands more than ever before the attention of all classes in the trade. The retailers note with appreciation that their interests, so long and seriously invaded, are at last to be a subject for consideration before the jobbers and the manufacturers. On the part of manufacturers there is the recognition of the seriousness of the question as relating to their interests and those of the trade at large, and also of the practical difficulties which lie in the way of the corrections of the evils complained of. The jobbers, too, as represented in the National Hardware Association, as well as other jobbers outside the borders of the Southern Hardware Jobbers' Association which deserves great credit for taking up the matter in a formal and official manner, are evidently impressed by the vigor with which the catalogue house question is coming to the front, and are considering the action which should be taken. Things debated in whispers are thus becoming the talk of the trade. Influences long at work beneath the surface are breaking out into organized effort. A disposition to ignore existing evils gives place to a determination to meet them intelligently, and the work of the few for their own and the general welfare is being taken up by the many who heretofore have stood aloof.

It is exceedingly important that the matter be taken up at the Atlanta conventions in the right spirit. Among the things which are necessary to the success of the movement is that in it all the various interests be united. How this can best be accomplished is one of the problems before the conventions. There is no doubt that with the close relations which exist between the Southern Hardware Jobbers' Association and the National Hardware Association the representatives of the latter strong organization will be present at Atlanta and will lend their aid in formulating and carrying out the plans which may be determined upon. The co-operation of the manufacturers is obviously essential, and it may be assumed that they will be given due recognition not only in the deliberations but in any effort which is made for the correction of the evils in question. The co-operation of the great outside jobbers should also be invited, for unless they sympathize and unite in the effort not much is likely to be accomplished. That the representatives of the National Retail Hardware Dealers' Association will have a prominent place in what is done may be assumed if the movement is taken up with any sincerity or prospect of success. This union of all interests concerned must be

recognized as the prerequisite to successful work. The gathering at Atlanta will naturally be the starting point for the movement, as all the great interests will be there represented. Anything of jealousy or self-seeking on the part of individuals or associations which would interfere with the joining of forces in such united effort would obviously imperil the whole undertaking.

It is above all things necessary that the matter be approached in a sane and reasonable spirit. Nothing is to be accomplished by attempting the impracticable. Errors of judgment in estimating the new competition will carry their own penalties. There must not be an indiscriminate or unreasoning condemnation of catalogue houses or their methods. Their rights as merchants must not be denied or invaded. The excellence of their business methods in many cases, instead of being condemned or ignored, should be acknowledged and commended. At the same time, anything disturbing or unbusinesslike in their methods should be pointed out and disapproved. What course of action can be taken, and to what extent it will be desirable to attempt to change conditions and methods, should be calmly and deliberately decided. The responsibility of the jobber who has often supplied the catalogue houses with goods should be recognized, and also the attractiveness of the orders of these great concerns which make so strong an appeal to the jobbers and manufacturers who have goods which must be sold. Above all, there must be sincerity in those who join with their fellows in combating the evil. The public denouncing of catalogue houses and their methods must not be a cloak to hide covert dealings with them. There is danger that some will attempt to carry water on both shoulders. There may be a disposition on the part of some to take the matter up in a way more demonstrative than sincere, so as to curry favor with the retail merchants. In view of all the circumstances and difficulties it will be easy to indulge in cheap declamation and fruitless discussion, but to reach agreement in regard to the principles which apply to dealings with catalogue houses and the influences which should be brought to bear upon them by jobbers and manufacturers is a problem which demands the best and most balanced thought of the trade. It is, therefore, desirable that at Atlanta there be a thoroughly representative gathering of those in the various branches of the trade who are willing to give this subject their frank and earnest consideration.

Condition of Trade.

An expression of opinion which is voiced quite generally by the jobbing trade is to the effect that business has been quiet during the month past. The season over the larger part of the country is two or three weeks late, and no doubt has to a great extent been responsible for the smaller than usual demand for spring and summer goods. It is proverbial that retailers' customers will not anticipate their requirements to any great extent, but put off buying until urgent necessity compels them to do so. A portion of the business usually done in April, which has thus been postponed, will probably not be recovered. Paints and Oils are included in the lines which have been exceptionally dull, as is also the case with Window Glass, this condition having prevailed during all of the present year. The month of May opens with more encouraging prospects and a promise of better business, owing to the expectation that more seasonable weather will prevail. Jobbers are confining buying largely to sorting up stocks, while inquiries are being received from them regarding fall and winter goods, and some orders have been

booked for these goods. Orders from retailers indicate that they are not overstocked on general lines.

Chicago.

(By Telegraph.)

Hardware jobbers are busy, and Chicago retailers are fairly so. While last week was relatively quiet, the business received on Monday and Tuesday of this week shows an improvement over that of a week ago. Cutting North winds which have blown continuously with the exception of one day during all the month of April are still blowing, and the disposition to buy Screen Cloth, Garden Tools and other strictly warm weather goods is not as strong as it will be the moment the direction of the wind changes. In some Wire products the mills are still behind their orders, and new business is coming in satisfactorily, while in others mills are catching up and are likely to be looking for business before long. An advance has been made in Bale Ties from the former discount of 82½ and 10 per cent. discount to 82½ and 5 per cent. discount, f.o.b. Waukegan. Chicago jobbers and warehousemen have advanced prices on Nuts, Bolts, Rivets and kindred goods, out of store, in sympathy with the new prices made by the Nut and Bolt manufacturers.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—There is an oncoming quietness in the market, which is apparently inevitable at this season of the year. We have rarely known it to fall that April forecasts the quieter conditions which are sure to prevail in May and June. We cannot keep under a high tension all the year, and it seems determined by trade winds and waves that May and June shall give us a breathing spell. The falling away or abatement this year has not been more than usual, and we think too much has been made of it in the daily press and trade papers. We must recognize the fact that enormous additions have been made by manufacturing plans during the last few years, and some new ones started which are not well enough placed to compete with those in the most favored localities. These former, of course, find it reasonably plain sailing as long as everything and anything goes, but a pinch of competition oft-times proves fatal. At other times it acts only as a needed dose of medicine, to bring the patient around into proper shape. Any how, it gives men time to think, to cast up their accounts and to "clean house." We know that in Nature the ground has to lie fallow in one out of so many years, and it would seem as though a similar force were manifest in the mercantile or producing fields. We have the waste of war in land campaigns or on the oceans to make up for in certain years; then, we have the waste of commercial war, not infrequently, to be atoned for in years of self denial and decline. Fortunately nothing in the Iron or Hardware line is now so high that it need topple over. There may be subsidences in some things, which by proper operation of combined influences may be gradual and give us no special shock.

Meanwhile the world does not stand still. New methods of merchandising develop all the while, and we have to keep wide awake in order to realize their import and take advantage of such features as may be adapted to our own special lines and purposes. In short, it is hard to be pessimistic, even though Pig and Billets may be declared dull at Birmingham and Pittsburgh, for labor is abundantly employed, money is in plenty and prices for nature's products are exceptionally good. The most untoward feature so far is the heavy fire loss for the first quarter.

St. Louis.

NORVELL-SHAIPLEIGH HARDWARE COMPANY.—We are thankful for beautiful weather for the opening of the World's Fair. Business buildings are decorated with flags and streamers and our streets are crowded with strangers. The rise in the Mississippi River at this point has so far caused no serious damage. Demand for Boat Oars has cleaned stocks. Season is three weeks late. Business on spring lines with the retailers has been slow. Business on Bicycles and Sundries, like the definition of faith—"The evidence of things hoped for. The sub-

stance of things not seen." No unusual developments in prices. While this is dictated the whistles of all the boats and factories along the river front are welcoming the arrival of the gunboat "Nashville." There was something of a lull in business in the early part of April, but May opens with bright prospects for good current business, the general character of orders indicating that retailers are not overburdened with stocks. The increasing number of mail orders also indicates short stocks, and an awakening of interest in the Hardware line in small and off the road places, where the voice of the traveling salesman is not so often "heard in the land."

Cleveland.

THE W. BINGHAM COMPANY.—Considering the long drawn out winter that we have experienced, and which is still with us, the Cleveland jobbers are having a very good trade. A large volume of orders is coming to us, and were it not for the backward season, general business would be exceptionally good. If we ever do have any warm spring weather we are going to have plenty of business to take care of. The jobbers here are getting their stocks in shape to supply their customers promptly. As this is one of the best distributing points in the country, naturally retail dealers will look to Cleveland for their immediate wants in a hurry.

Reopening of large plants like the American Bridge Company, on account of large orders received for structural iron to replace that destroyed in the great Baltimore fire, and also from the Japanese Government for bridge material, is quite encouraging, and is going to keep a large number of artisans busy for a long time to come who have been idle for some time back, and a large amount of steel material will be used. A large number of inquiries are coming to us for material of all kinds, proving that as soon as weather conditions warrant there will be plenty of trade for all of us. The question is, Will those who put off stocking up promptly be able to get their supply as quickly as they desire? We advise dealers to keep their stocks well assorted. Just at present there is a scarcity of some numbers of Fence Wire, and the mills seem to be full of orders for this material. Customers whose stocks are low would do well to place their orders at once to be filled as soon as the mills can supply the material.

On the whole trade generally is very good, and we have no reason to complain. We are all looking forward to a large volume of business as soon as spring opens and the ice in our lakes breaks up and thus give us an opportunity to ship goods by water, as there is considerable inquiry for goods to be transported at the opening of lake navigation. Handles for Agricultural Tools are quite scarce—that is, Handles of good quality—and the jobbers who laid in a stock of steel goods early have the best assortment to deliver to their customers now. We advise dealers to buy their Shovels and Spades, Garden Rakes, Manure Forks and Spading Forks at once, as there is a shortage of good Handles throughout the country, and it is getting worse every day.

Baltimore.

CARLIN & FULTON.—After a long spell of gloomy, cold and wet weather, which has kept back vegetation and interfered greatly with farming operations in this and our neighboring States, we now believe spring has come at last, and in proof thereof the fisherman is generally trying his luck and the circus is about to arrive. The fruit crop, after the usual prophecies of untimely death from blighting frosts, seems to have resurrected, and the general opinion now is that it will be large. This means a great deal to large sections of our country devoted to fruit raising and truck gardening, and the result of a good season is the circulation of a large amount of money among land owners, labor, and the transportation companies.

The establishment of canneries throughout the country is increasing greatly, and in one way is a great advantage to the farmer in giving him a market right at his own door for his produce, saving him charges for freight and commissions, which frequently leave him almost nothing; but, on the other hand, the farm hand is more inclined to work in the factory than in the field, and the

result is that often in the most critical time labor is almost unobtainable.

Until after July we expect business from the cotton States to diminish, the merchants generally preferring to reduce stocks bought early in the spring and to confine their purchases to absolute requirements.

Locally, there will be in this city a great expenditure for several years of large amounts of money partly in municipal improvements such as a new sewerage system and dock improvements and also in rebuilding the warehouses, banks, office buildings and other structures destroyed in the late fire. Building operations have been retarded, awaiting the necessary legislation attending the widening of streets, condemnation of property and other formalities, but we hope now that the work will go on with dispatch and in a few months a great change will be noticed in what is to-day a barren waste. There will be undoubtedly a great demand for labor. The skilled mechanics will have plenty to do, provided the walking delegate will not be too greatly in evidence, which we hope will be the case.

Philadelphia.

SUPPLEE HARDWARE Co.—This section of the country has suffered with not only unusual but unseasonable weather for practically the entire month of April; the country trade has had to contend with cold, raw and disagreeable conditions, and many farmers have had to contend with conditions which prevented crop planting. The effect has been to retard trade in the entire section where these conditions exist, and at this writing the vegetation and foliage are about up to what they were in the South during the writer's visit there five weeks ago. We cannot call to mind any year when weather conditions have been so unfavorable to trade, as well as spring planting, as the past month of April. The entire country has been confronted with cold, rain, storms and flood. This has naturally been discouraging to local trade, and taking all this into consideration we should naturally look for good trade during the month of May.

The past month or six weeks has fortunately seen a diminution in stock speculation, and transactions of a million shares per day have receded to a hundred thousand, the climax of the cotton speculation having scared many a man, and the consequence is money has been more abundant in the centers of the money markets. The foreign shipments of some \$19,000,000 in gold in the past few weeks and the probability of \$20,000,000 additional have made but little impression in financial circles. One cannot help but look back some nine years ago, when we were compelled to go abroad for \$250,000,000 in gold and practically pay a premium on the same, and a comparison of this with the balance now in the hands of the United States Treasury is certainly gratifying. The great misfortune of that was that our Government gave long time bonds for gold purchase; had they been short bonds, they could well have been paid out of the surplus accumulated in the Treasury between that time and the present, and then we would not hear the clamor about a growing surplus, because the surplus would have been paid out, as it should have been, for our temporary borrowings when our expenses were greater than our income. However, "all's well that ends well."

There is still a great shortage in some kinds of goods, especially in agricultural goods, and more particularly hoes for the cotton district, the closing of several factories when the present combination came into effect having left the remaining factories in a condition in which they are now unable to fill their orders. This is a great misfortune to the country, especially the Southern section. Some other goods are scarce and manufacturers on several kind of goods are quite behind their orders. Collections are fair.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—We might as well conclude to pass up spring trade in this territory, as there has been none. The idea that it will go over into summer is no good. It is lost, and now what we have to look forward to is fall business. So far Government reports are very favorable as to growing crops and the outlook for prices is flattering. There is no improvement in

outlook as regards lumber interest, nor is there likely to be until we pass into a new year. Altogether it is a waiting proposition, and as we are assured "All things come to him who waits," we bide our time in patience. Collections still are in the same rut heretofore reported and there is no improvement in sight.

San Francisco.

PACIFIC HARDWARE & STEEL Co.—Although we are well along into what is generally known as our busy season, we hear frequent complaints that business is quiet. We are glad to say that our own experience would not warrant such a statement and that we have been continuously busy. It is true that figures do not show that sales are quite up to last year, but that is hardly to be expected under the conditions of extreme competition that prevail in all our territory. Since the first of the year competition has been bitter, almost to the point of personal animosity, and we might state that never in our experience have all classes of goods in our line been handled at such close margins. If, therefore, with the low prices prevailing, the magnitude of business has not fallen off seriously, it would appear that there is a very good demand at this time. Collections have been in the main satisfactory and prospects for continued good business have never been brighter.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—This has been one of the most backward seasons the South has ever known, and there is no doubt that business has been considerably affected by it. People have put off buying spring and summer goods much later than usual. Notwithstanding this, there has been a pretty fair movement of Refrigerators, Freezers, Wire Cloth, Poultry Netting, Garden Tools and other goods of this character. We will, no doubt, have nice weather during May, and we look for some improvement in business, although May is not usually a very large month. Many jobbers of the South take stock during May and wind up their business year June 1. Collections are extremely good and prospects for summer and fall trade are extremely flattering.

NOTES ON PRICES.

Wire Nails.—While current demand shows considerable decrease, specifications on contract orders are being shipped by the mills. These will keep the mills well employed for the coming six or eight weeks. The market is steady, with a strong tone. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots.....	\$1.90
Retailers, carload lots.....	1.95
Retailers, less than carload lots.....	2.05

New York.—Local demand is about up to that of last year at this time. With seasonable weather and the continued absence of labor troubles a more active market is hoped for. The disinclination of investors to engage in building operations will restrict requirements considerably at this point. Quotations are as follows: Single carloads, \$2.10; small lots from store, \$2.20.

Chicago, by Telegraph.—Wire Nails are dull, though prices are unchanged, as follows: Carload lots to jobbers, \$2.10 per 100 pounds; less than carloads to jobbers, \$2.15 per 100 pounds; carloads to retailers, \$2.15 per 100 pounds; less than carloads to retailers, \$2.25 per 100 pounds, all f.o.b. Chicago.

Pittsburgh.—Demand for Wire Nails is steadily falling off, but the mills are well filled up for this and next month and are running to full capacity on contract orders. Buyers are getting better deliveries of Wire Nails than for some time. Prices are very firm and we quote: Wire Nails, \$1.90 in carloads to jobbers, \$1.95 in carloads to retailers, and \$2 to \$2.05 in small lots to retailers, all f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days, plus actual rate of freight to point of delivery.

Cut Nails.—No meeting of the Cut Nail Association was held during the month of April, but manufacturers will probably get together some time during May. New

business is somewhat lighter, but mills are working on contract orders. There are indications that prices are being slightly shaded on orders for delivery at certain points, though the market is generally well maintained. Quotations are as follows for Steel and Iron Nails, in all quarters: \$1.75, base, carloads, and \$1.80 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—Conditions in the local market remain unchanged as to demand and quotations. Requirements are about normal, with a steady call for small lots from store. Quotations are as follows: Carloads on dock, \$1.89½; less than carloads on dock, \$1.97½; small lots from store, \$2.05.

Chicago, by Telegraph.—Cut Nails are not greatly in evidence and prices are unchanged as follows: Carload lots, both Iron and Steel Nails, Chicago, to jobbers, 1.91½, base; less than carloads, \$1.96½. Retailers and large consumers pay 10 cents per 100 pounds above jobbers' prices. Jobbers sell at from \$2.10 to \$2.30, base, f.o.b. Chicago warehouse, according to customer, size of order, &c.

Pittsburgh.—New business in Cut Nails is rather light, but the mills are pretty well filled up on contracts. Prices are fairly well maintained, but in exceptional cases are being slightly shaded on business for delivery at certain points. We quote Steel and Iron Cut Nails at \$1.75, base, in carload lots, and \$1.80 in less than carloads, f.o.b. mill, terms 60 days, less 2 per cent. off in 10 days.

Barb Wire.—Demand during the early part of the year was larger than that of last year, while present requirements show a falling off. Mills are now catching up with back orders. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$2.20	\$2.50
Retailers, carload lots.....	2.25	2.55
Retailers, less than carload lots.....	2.35	2.65

Chicago, by Telegraph.—Some grades of Barb Wire are still greater in demand than the power of the mills to supply, but the general demand is lighter. Prices are unchanged, as follows: Carload lots, Painted Wire, \$2.40; Galvanized, \$2.70; to retailers, carload lots, Painted, \$2.45; Galvanized, \$2.75; to retailers, less than carload lots, Painted, \$2.55; Galvanized, \$2.85; Staples to jobbers, \$2.25 for Plain and \$2.65 for Galvanized, with 5 cents advance to retailers.

Pittsburgh.—New business has fallen off very materially and the mills are fast catching up with old orders. It is said spring trade in Barb Wire this year was much heavier than last year. Prices are firm. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carloads.....	\$2.20	\$2.50
Retailers, carloads.....	2.25	2.55
Less than carloads.....	2.35	2.65

Smooth Fence Wire.—While new business has fallen off, mills are busily engaged in catching up with contract orders. Quotations are as follows, f.o.b. Pittsburgh; terms, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.80
Retailers, carloads.....	1.85
Less than carloads.....	1.95

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12	12½	13	14	15	16
Annealed.....Base.	\$0.05	.10	.15	.25	.35	.45	.55		
Galvanized....	\$0.30	.35	.40	.45	.55	.65	1.05	1.15	

Chicago, by Telegraph.—Woven Wire Fence, Poultry Netting and related lines are active sellers, and some mills are still several weeks behind their orders. Prices remain as follows: Smooth Fence Wire, sizes 6 to 9, \$2 per 100 pounds in carload lots to jobbers, f.o.b. Chicago; \$2.05 per 100 pounds to retailers in carload lots and \$2.10 in less than car lots.

Pittsburgh.—The mills continue very busy and will be

for this and next month, but are running mostly on old contracts, new business having fallen off. We quote as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days: Plain Wire, \$1.80, base, for Nos. 6 to 9, in carloads to jobbers, and \$1.95 to \$2 in small lots to retailers; Galvanized, 30 cents extra for Nos. 6 to 14.

Binder Twine.—The prices announced by the International Harvester Company appear to have been adopted very generally throughout the West. Eastern prices are, as a rule, ¼-cent less, which is the difference in freight between Chicago and New York. Demand will be largely confined to Standard Twine, according to reports, with but a small call for Manila. The market is referred to as quite firm at prices announced by the Harvester Company, as follows:

	Cents per lb.
Sisal	10¼
Standard	10¼
Standard Manila (550 feet).....	11¼
Manila (600 feet).....	12¼
Pure Manila (650 feet).....	13¼
Five-ton lots, ¼ cent less; carload lots, ¼ cent less.	
Kansas City, Minneapolis, Omaha, Council Bluffs, ¼ cent higher.	
Pacific Coast points, 1 cent higher.	

Cordage.—The difference in price between low and high grades of Manila Hemp has resulted in a variety of qualities and prices of Manila Rope. The market on pure Manila and first and second grades of Sisal Rope appears to be well maintained. Quotations on the basis of 7-16 inch diameter and larger are as follows: Pure Manila, 12 cents per pound, with a rebate of ¼ to ½ cent per pound to largest buyers; other grades of Manila, 10 to 11 cents, according to quality; pure Sisal, 9¼ cents, with ¼ cent rebate to largest buyers; Mixed Sisal, 8 cents per pound, with no rebate.

Oils.—**Linseed Oil.**—The market continues dull and uninteresting, with only a fair demand for small lots. The hope is expressed that with the advance of spring a revival in business may take place. With the possible exception of large lots of State and Western Oil, the market remains firm. Quotations are as follows: City Raw, in lots of five barrels or more, 42 cents per gallon; in lots of less than five barrels, 43 cents per gallon; State and Western Raw, 39 to 40 cents per gallon. Boiled Oil, the usual 2 cents advance per gallon over Raw.

Spirits Turpentine.—The week has shown little disposition on the part of buyers to anticipate their requirements, resulting in a light demand. The market fell off early in the week, but is now firm at our last quotations, owing to light stocks. Quotations, according to quantity, in this city are as follows: Oil barrels, 58 to 58½ cents; machine made barrels, 58½ to 59 cents. Receipts in the South are reported light owing to unseasonable weather, which has retarded the new crop.

NATIONAL HARDWARE ASSOCIATION AND THE CATALOGUE HOUSE QUESTION.

IT is understood that at the meeting of the Executive Committee of the National Hardware Association, which will be held at Boston May 9 to 11, the question of catalogue house competition and what the association should do in regard to it will be a prominent subject for consideration. It is expected that the representatives of the National Retail Hardware Dealers' Association will be present on invitation, participate in the discussion and aid in determining the course to pursue. Such conference may obviously be utilized to prepare the way for an intelligent and comprehensive discussion at the Atlanta meetings, to which the officials of the National Hardware Association have been invited.

GOODELL COMPANY, 105 Main street, Antrim, N. H., among a number of Hardware specialties are manufacturing the Family Cherry Stoner, which has been on the market for a number of years and has had a large sale. This machine removes the stones from ripe cherries without waste or mashing, and leaves the fruit plump and round.

THE IRON AGE DIRECTORY FOR 1904.

THE eighth annual edition of THE IRON AGE DIRECTORY is now being distributed to our subscribers and advertisers. In size, appearance and principal features it is a counterpart of the seventh edition, but thoroughly revised to date. It is a cloth bound volume containing 296 pages, each 6% x 4% inches, with the matter in double columns, as shown in the page reproduced herewith.

This Directory is a classified index of all the goods made by those who advertise in *The Iron Age*, condensed into the smallest practicable compass. The page here illustrated affords a slight indication of the range and scope of the Directory. There are over 5000 different

without charge to every subscriber was a notable advance in journalism, and its wisdom has been abundantly shown in the appreciation in which THE IRON AGE DIRECTORY is held in all departments of the trade. This new edition, larger and more complete than any of its predecessors, is sent out in the hope that it will lighten the labors and promote the success of the thousands who make use of it.

BLAKE & JOHNSON, Waterbury, Conn., contemplate the erection of a large building adjacent to their machine tool department building on their property at North Elm and Spark streets. The new building will be about 50 by 200 feet, and five stories, including a well lighted base-

The Iron Age Directory

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- Vises, Solid Box—**
Columbian Hardware Co., Cleveland, O.
Eagle Anvil Works, Trenton, N. J.
Tower & Lyon Co., 95 Chambers St., New York.
- Vises, Tubing, Polished—**
Hollands Mfg. Co., Erie, Pa.
- Vises, Woodworkers—**
Athol Machine Co., Athol, Mass.
Barbour-Stockwell Co., Cambridgeport, Mass.
Columbian Hardware Co., Cleveland, O.
Hollands Mfg. Co., Erie, Pa.
Massey Vise Co., Chicago, Ill.
Wyman & Gordon, Worcester, Mass.
- Volt Meters—**
(See Meters, Recording Volt.)
- Wads, Gun—**
Peters Cartridge Co., Cincinnati, O.
Union Metallic Cartridge Co., Bridgeport, Ct.
- Waffle Irons—**
(See Irons, Waffle.)
- Wagon and Carriage Machinery—**
Williams, White & Co., Moline, Ill.
(See Axles, Chains, &c.)
- Wagon Axles, Chains, &c.—**
(See Axles, Chains, &c.)
- Wagons, Delivery—**
Shipman, Bradt & Co., De Kalb, Ill.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.
- Wagons, Dump—**
Kilbourne & Jacobs Mfg. Co., Columbus, O.
- MERCHANTS.**
Contractors' Equipment Co., Betz Bldg., Philadelphia, Pa.
- Wagons, Mill—**
Jackson Mfg. Co., Harrisburg, Pa.
Kilbourne & Jacobs Mfg. Co., Columbus, O.
- Wagons, Motor—**
(See Carriages.)
- Walters, Dumb—**
Energy Elevator Co., 408 Cherry St., Philadelphia, Pa.
Morse, Williams & Co., Philadelphia, Pa.
J. G. Speidel, Reading, Pa.
Storm Mfg. Co., Newark, N. J.
Warner Elevator Mfg. Co., Cincinnati, O.
Warsaw Elevator Co., Warsaw, N. Y.
- Walters, Silver Plated—**
International Silver Co., 9-13 Maiden Lane, New York.
- Walk Scrapers—**
(See Scrapers, Walk and Street.)
- Wall Scrapers—**
(See Scrapers.)
- Wands, Calisthenic—**
Piqua Handle & Mfg. Co., Piqua, O.
- Wardrobe Hooks—**
(See Hooks, Coat, Hat, &c.)
- Wardrobes, Office and Shop—**
(See Lockers.)
- Ware, Aluminum—**
Sidney Shepard & Co., Buffalo, N. Y.
- Ware, Copper—**
Rome Mfg. Co., Rome, N. Y.
Sidney Shepard & Co., Buffalo, N. Y.
- Ware, Enameled—**
Avery Stamping Co., Cleveland, O.
Cleveland Stamping & Tool Co., Cleveland, O.
Sidney Shepard & Co., Buffalo, N. Y.
Sturges & Burn Mfg. Co., Chicago, Ill.
- Ware, Hollow, Cast Iron Stove—**
Blacklock Foundry Co., So. Pittsburg, Tenn.
Chattanooga Roofing & Foundry Co., Chattanooga, Tenn.
- Ware, Hollow, Silver and Silver Plated—**
International Silver Co., 9-13 Maiden Lane, New York.
- Ware, Hollow Steel—**
Avery Stamping Co., Cleveland, O.
Cheswick Mfg. Co., Cheswick, Pa.
Cleveland Stamping & Tool Co., Cleveland, O.
Fanner Mfg. Co., Cleveland, O.
New York Stamping Co., Brooklyn, N. Y.
- Warehouse Trucks—**
(See Trucks, Store, Warehouse, &c.)
- Ware, Japanned—**
Sturges & Burn Mfg. Co., Chicago, Ill.
- Ware, Platinum—**
J. Bishop & Co., Malvern, Pa.
- Ware, Sheet Iron—**
Sidney Shepard & Co., Buffalo, N. Y.
- Ware, Tin—**
(See Tinware.)
- Ware, Wooden—**
Hill Dryer Co., Worcester, Mass.
- Warm Air Furnaces—**
(See Furnaces, Warm Air.)
- Warmers, Electric Foot—**
United Electric Heating Co., Detroit, Mich.
- Warmers, Electric Plate—**
United Electric Heating Co., Detroit, Mich.
- Warmers, Soapstone Foot—**
Pike Mfg. Co., Pike, N. H.
- Warp and Yarn—**
Broderick & Bascom Rope Co., St. Louis, Mo.
Estes & Sons, Fall River, Mass.
- Wash Benches, Stands—**
(See Benches, Tub and Wringer.)
- Washboard Blanks—**
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Washboard Knives—**
(See Knives, Machine.)
- Washboards—**
Lloyd Mfg. Co., Minneapolis, Minn.
Saginaw Mfg. Co., Saginaw, Mich.
- Washer Cutters—**
(See Cutters, Washer.)
- Washer Machines—**
Cleveland Punch & Shear Works Co., Cleveland, O.
National Machinery Co., Tiffin, O.
- Washers and Disks, Rubber—**
(See Gaskets and Rings, Rubber.)
- Washers and Street Hydrants—**
(See Hydrants and Street Washers.)
- Washers, Brass—**
Wm. H. Haskell Mfg. Co., Pawtucket, R. I.
Nictown Plate Washer Co., Philadelphia, Pa.
- Washers, Cast—**
Wilson & Smith, Worcester, Mass.
American Iron & Steel Mfg. Co., Lebanon, Pa.
Bangroft & Co., Drexel Bldg., Philadelphia, Pa.

tools, machines and miscellaneous articles in light and heavy Hardware and allied lines, conveniently arranged and crossheaded, the production of 1373 different concerns who advertise in the paper. The increasing number of manufacturers and the endless variety of products make such a reference work not only convenient, but practically indispensable to the busy dealer and buyer, who will find in this handy little volume a mass of information conveniently and systematically arranged. Owing to the great edition which is required to permit the mailing of a copy to each of our subscribers, it may be that some of our subscribers have not yet received a copy, but the entire list will be supplied as speedily as possible.

The issuing of such a Directory and distributing it

ment. It will be occupied by Blake & Johnson's manufacturing department, now located on East Main street in a building no longer adequate to the demands of the department, which manufactures piano, organ and action Hardware, special Screws, Pins, Studs, Threaded Wires, &c. The Blake & Johnson business, which was established in 1852, began manufacturing on the East Main street site. In 1891 it became necessary to have additional room, and two acres of land on North Elm street was acquired and a machine shop was erected. The new building will entirely replace the East Main street shop and will double the capacity of the manufacturing department. A new office building will also be erected on the North Elm street property.

RUSSELL & ERWIN MFG. COMPANY'S NEW PHILADELPHIA SHOWROOM.

THE RUSSELL & ERWIN MFG. COMPANY have recently completed a new showroom for their Philadelphia branch, 1340 Chestnut street, two views of which are given herewith. To properly show the many fine examples of Art Builders' Hardware the various types, styles and patterns have been handsomely mounted in fine cases which are contained in a unique showroom, simple

specimen of the numerous decorative types, from the chaste severity of the Pemberton Colonial to the florid Christensen, being mounted in special woodwork consonant with the particular type and its artistic treatment.

A. Z. BOYD.

A. Z. BOYD, manufacturers' sales agent, 56 Reade street, New York, is representing the following manufacturers and lines of goods: Link Chain Belting,



Fig. 1.—Show Room with Display Cases Closed.

but elegant in character. The necessity for displaying such goods of the finer grades in appropriate settings, so that both architects and builders and especially the owners of fine residences and buildings, can in advance get some conception of the ultimate effect, is daily more apparent. In this showroom the surroundings, both interior and exterior, are such as to lend themselves to favorable judgment. The location of the showroom is in the Young Men's Christian Association Building, at Fif-

Sprockets, Buckets, &c., Buhl Malleable Company; Wood Split Pulleys, Foster Pulley Works; Spring Cutters and Keys, Hindley Mfg. Company; Shovels, Spades and Scoops, Indiana Shovel Company; Keystone and Monarch Ratchets, Westcott Wrenches and Nail Sets, Keystone Mfg. Company; Hack Saws and Blades, Massachusetts Saw Works; Pipe Cutters, Vises, &c., Mark Mfg. Company; Alligator Wrenches, John A. Roebling's Sons Company; Axes of all kinds, Standard Axe & Tool Works;



Fig. 2.—Method of Sampling Goods.

teenth and Chestnut streets, in the heart of the fashionable district, only a block from the Pennsylvania Railroad Broad street station, close to Wanamaker's, and around the corner from the fine new Bellevue-Stratford Hotel. The samples themselves are so mounted as to treat each of the many *motifs* with a distinction and exclusive appropriateness of its own. In this department the company offer for the inspection of a critical public a collection of Domestic Art Work in Metal Effects reproduced from the craftsmen of the historic Renaissance, each

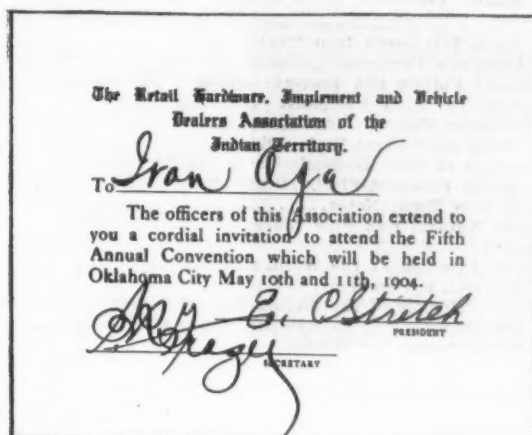
malleable iron Screw Wrenches, Vandergrift Mfg. Company; Little Giant Stocks and Dies, Taps, &c., Wells Bros. Company, and for export only, Twist Drills made by the Etna Mfg. Company.

THE WATERBURY ROPE COMPANY have just removed from 134 Lake street to new quarters at 170 Lake street, Chicago, where they will occupy two floors and carry a large stock of Wire and Fiber Rope and allied lines.

RETAIL HARDWARE, IMPLEMENT & VEHICLE ASSOCIATION OF THE INDIAN TERRITORY.

AS already announced, the organized dealers in Hardware, Implements and Vehicles of the Indian Territory will hold their fifth annual meeting in Oklahoma City, O. T., on May 10 and 11. A very interesting programme has been prepared, among the formal subjects for discussion being the following:

- "Catalogue Houses and Comparison of Retail Prices."
- "Benefits Derived from Organization."
- "What Trade the Manufacturers and Jobbers Should Rightfully Canvass and Sell."
- "Why Dealers Encourage Association Insurance."
- "The Necessity for Co-operation of Dealers from a Business Standpoint."
- "Existing Rules Between Manufacturer, Jobber and



Retailer—Are They Satisfactory? Should the Retailer Have a Voice in Determining?"

"How Can We Prevent Buggy Trailers and Stove Peddlers?"

All of these discussions will be initiated in short formal addresses by members of the association, several on each topic. Other features of the meeting, which promises to be instructive and largely attended, are addresses by M. L. Corey, secretary of the National Retail Hardware Dealers' Association, and N. D. Robnett, president of the Western Implement Dealers' Association, and the Question Box. This association is composed in the main of Indian Territory merchants, but also comprises a number of Oklahoma dealers, and the object of holding the meeting in Oklahoma City is to still further enlarge the membership from that section.

U. M. C. 1904 CATALOGUE.

THE UNION METALLIC CARTRIDGE COMPANY, Bridgeport, Conn., and 313-315 Broadway, New York, have just issued a new 84-page illustrated catalogue of U. M. C. Ammunition. Among the new features are the Nitro Club Tournament Loads and the U. M. C. 3½ dram Target Loads in Nitro Club and Arrow shells. In other new goods there are several additional sizes of Metallic Cartridges. The catalogue is gotten out in convenient size and represents the complete U. M. C. line, including the well-known U. M. C. brands of Empty and Loaded Shells, Wads, Primers and Metallic Cartridges.

FARWELL, OZMUN, KIRK & Co., St. Paul, Minn., have compiled what they call "The Retail Dealers' Price List," covering the entire line of goods listed in their 1904 general Hardware catalogue, issued some time since. This is referred to as not a list of approximate values, but a reliable, dependable retail selling list, showing what the dealer should get for the goods, and aiding him in making sales of articles not usually carried in stock. In ordering goods, it is pointed out, it will be found of material assistance, as often the merchant desires a certain article that he can retail at a stated price, and this information is given on each item in their catalogue, except a few staples. The publication is now in the hands of the printer and will be ready for distribution about May 14.

Letters from the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

Levying Contributions on Jobbers and Manufacturers.

FROM A WESTERN MERCHANT: We fancy that your readers, one and all, must have enjoyed the letter, published in your issue of April 7, on "Levying Contributions," &c. This has come to be such an abuse that it is well to frequently ventilate it. The close margin on which goods are sold, the concessions made to the customer from one year's end to the other, in the way of allowances, goods returned, extra time, &c., would surely constitute a sufficient evidence of good will, without being obliged to chip in for every church, fire engine house, armory, or county fair.

Whenever we read of a high wind or a hard rain in any part of the country for a radius of 500 miles we know that we are presently to hear from some of the "good ladies" of the town on some customer's letter head, soliciting funds or their equivalent to repair damages. As an interesting example, however, of just how this is worked, we submit the following: Not long since we received from one of our good customers a confidential letter, explaining that a certain church at his place had applied for the use of his stationery for the purpose of soliciting from his various correspondents for its own immediate purposes. The merchant goes on to say that the object is a worthy one, but that it is no particular favor to him that any donation be made." This put us on our guard, and when the subsequent mail brought us the appeal, we were not surprised. There was the familiar letter head, with every evidence of having been written by the concern themselves or with their full authority. The company name was signed in typewriting and followed up by initials, which were those of the principal partner—probably not put in by the man himself, but by some shrewd person who thought to lend weight to the communication.

The old scheme of blackmailing for catalogue purposes has pretty much gone out of vogue; we hope that the begging scheme will follow its distinguished example and that its day will soon be over. We have no doubt but that many merchants in the country are thus annoyed and lend themselves very unwillingly to such schemes. We hope they will learn to be equally frank as the one cited above. It is greatly to his credit.

The Growing Scarcity of Timber.

FROM A MANUFACTURER IN OHIO: Many of your readers and advertisers are undoubtedly interested in the question, Where is our future supply of timber to come from? Already certain kinds of hard woods, such as hickory, ash, oak, &c., are insufficient for the demand, and inferior grades are being used. Already prices have risen uncomfortably high as compared with former years, and many manufacturers are worried over their inability to obtain lumber sufficient for their needs. Handles for Shovels, Steel Goods, &c., are becoming quite scarce, and consequently high in price. Rake Handles are especially scarce and so high that prices of the finished goods must certainly advance by another season. Several parties that we know of are experimenting with hollow steel Handles, but even if these can be made light enough and cheap enough, we do not believe they would ever become popular, for obvious reasons.

Where, then, is the timber supply to come from? If it can be imported from other countries the tariff should be removed on this item, owing to its scarcity, or else the Government should reserve tracts of land in every State and plant the kinds of timber most in demand, and sell it as it matures, or else pay a bonus to parties planting timber for manufacturing purposes. These suggestions may seem objectionable at first thought, but no doubt they could be worked out into tangible shape to the benefit of future generations. In this age of hustle after

the almighty dollar every one who has timber land thinks of realizing on the timber and utilizing the land for immediate profit, and no one seems willing to plant timber for the benefit of future generations. What, then, is to be done, and where are the manufacturers of this country to look for their timber supply? Perhaps some of the other readers of your journal may have ideas and suggestions better than those herein set forth; but at all events the matter is one that should receive serious consideration, and it cannot be agitated too soon and some feasible plan worked out.

The Arrangement of Window Displays.

FROM A MERCHANT IN WISCONSIN: The most satisfactory plan we have found is to put the matter into the hands of the clerk showing the most aptitude for the work, letting him have entire charge, and aiding him with any suggestions that we think will enable him to improve his work. We find this much more satisfactory than letting different clerks try their hands at the work.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses:

FROM BISHOP & SHUMARD, New Hampton, Mo., who have purchased the Hardware and Grocery business of Schwartz & Co.

FROM THE CARPENTER HARDWARE COMPANY, incorporated with a capital of \$50,000, who have succeeded Glouster Hardware Company, Glouster, Ohio, and Nelsonville Hardware Company, Nelsonville, Ohio, and will continue the wholesale and retail business at both places. They are also expecting in the near future to open a new store at Athens, Ohio.

FROM LONG & JOYNER, who have succeeded M. Long in the Hardware, Stove and Implement business at Waynesville, Mo.

FROM THE HENDERSON BROS. COMPANY, Butte, Mont., who have been incorporated with a capital of \$25,000, \$15,000 paid in. They will carry on the wholesale and retail business in Shelf Hardware, Stoves and Tinware, Paints, Sporting Goods, &c.

FROM GRAHAM-SALISBURY-WHITE COMPANY, Pasadena, Cal., who have been incorporated with a capital stock of \$25,000, and will conduct the Hardware, Stove, Implement and Plumbing business.

NATIONAL RETAIL HARDWARE DEALERS' ASSOCIATION.

THE 1904 official manual and directory of the National Retail Hardware Dealers' Association has just been issued. This year it is a volume of 160 pages, which contains a good deal of matter of interest and value to the merchant in sympathy with the movement. It is embellished with many portraits, including those of the national officers and of the State associations affiliated with the national, as well as those of the officers of the national jobbers' and manufacturers' associations.

U. J. ULERY, representing the Clauss Shear Company, Atlas Shear Company, Napanoch Knife Company, Clyde Cutlery Company, Deerlick Oil Stone Company and International Cutlery Company, has moved from 200 Broadway, New York, into larger quarters in the Rogers, Peet & Co's building at 7-9 Warren street, where the accommodations are better adapted to the prompt handling of an increasing business, both foreign and domestic.

TUTTLE & BAILEY MFG. COMPANY have removed their Chicago office from 49 to 211-213 Lake street, where they will occupy four floors and carry a complete stock of their Side Wall Registers. Robert Ketting is Chicago manager.

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THE CATALOGUE HOUSE QUESTION.

DURING the week the catalogue house question has continued to attract the attention of the trade, especially in its connection with the approaching Atlanta meeting. Those in charge of the interests of the Southern Hardware Jobbers' Association deserve much credit for the energetic and intelligent way in which they are making preparations for a thorough discussion of the subject at the Atlanta conventions. Invitations have been extended to leading jobbers and manufacturers to speak on the subject, and the indications are that it will be a topic of commanding prominence at the gathering. The representatives of the National Retail Hardware Dealers' Association will also be present, and will doubtless be prepared to present a mass of facts and an array of arguments which will aid in determining the courses which the united interests may adopt with a view to counteracting or correcting some, if not all, of the evils in question.

Norvell-Shapleigh Hardware Company and the National Hardware Association.

An interesting development since our last issue is the decision on the part of Norvell-Shapleigh Hardware Company to join the National Hardware Association. This decision and the reasons leading up to it and the understanding on which the step was taken are given in the following telegram in reply to an inquiry as to their course and policy:

To the Editor: We have joined the National Jobbers' Association upon assurance that a committee would be appointed to take up the question of catalogue house competition exclusively. The most important thing at this time is harmony between jobbers' associations, retail dealers' associations, manufacturers' associations and independent jobbers, retailers and manufacturers. If we expect practical results we must all lay aside self-seeking and petty jealousies and work together in sincerity with the one object of correcting existing evils. It seemed to us that we could make better progress by taking advantage of the experience and organization of the National Hardware Association in advancing this cause. Also that working with them would promote greater harmony. Therefore we accepted their invitation to become a member of their association.

NORVELL-SHAPLEIGH HARDWARE COMPANY.

This action is significant in indicating that the National Hardware Association are intending to take up the question and unite in seeking a solution of the catalogue house problem. It is significant, too, that some of the independent jobbers also are evincing an interest in the subject which was not manifest a short time ago.

LETTERS FROM MANUFACTURERS.

The following letter is from a very prominent manufacturer of a leading line. It will be seen that in it he discusses the question in a broad way, and argues that the catalogue house labor under disadvantages which will give the retail merchant on the ground a preference in the marketing of goods. A significant reference is made to the extent to which catalogue houses obtain a supply from jobbing houses, although presumably they have little difficulty in finding manufacturers who are glad to have them as customers. Our correspondent writes:

To the Editor: You have given me a conundrum—let me give it up and ask for an easier one? Perhaps it can be answered after an exchange of views at the Atlanta meeting.

I take it for granted that by the term "catalogue houses" they refer specifically to those who sell direct to the consumer. This is undoubtedly an evil which the retail Hardware merchants feel and are disturbed

over; but I believe, in many instances at least, that they magnify this evil.

When one of their customers refers to the price of an article which they can buy by mail, let them discuss the details of the transaction somewhat, and I think in many instances they will convert the purchaser to their views and make the sale.

THE RETAILER'S ADVANTAGES.

For a purchaser, whether a townsman or a farmer, to order by mail, he has the expense of the letter writing; the postage stamp; the buying of the draft and paying exchange; he buys "out of sight and unseen;" takes his chances on getting the article that suits him; must pay the express or freight charges; and then, at his end of the line, must, perhaps, pay a cartage charge. Then suppose the article does not quite please him, presuming that it is just what he ordered. It may be a little inferior—not quite as good as he expected; it may be a little too heavy, or a little too light, a little too large or a little too small in some way; still he must keep it. If it is damaged in transit he cannot well get damage from the railroad company, but must take the article.

As against these features, he buys from the home merchant; he makes a selection of the article, determining his choice by making a comparison of prices, sizes, grades, &c. If, on reaching home with it, he or any of his family think they would like something different, he knows that the merchant will exchange it, if unused. He knows if there is any defect in it the merchant will make it good, and, furthermore, he has dealt with a fellow townsman, perhaps, with whom he has other dealings. Perhaps the buyer is a farmer, who wants to sell the merchant a load of hay for his horse or cow, of a load of wood, or something.

Now, all these points the retail merchant should bring to bear, and, in some instances, perhaps, meet the catalogue house price on that particular sale, for he may never have to make it again with that same party. He will not always succeed; neither does he succeed in selling every purchaser that comes into his store. That purchaser may go down the street and purchase of his neighbor; if a farmer, he may drive to the next town another day; so that the retail merchant must expect some competition from some quarter, and the worst of it does not always come from the catalogue houses.

OBTAINING GOODS.

I venture to say that this "consumer catalogue house" can obtain all the goods they want, and of any brand. If not from the manufacturer, they certainly can of the jobber. Jobbers of both associations are selling "consumer catalogue houses" almost daily. The blame, if any, for such houses having the manufacturers' staple brands on their shelves is not always with the manufacturer; it is more likely to be with the jobber.

MAIL ORDER BUSINESS.

As for the other class of catalogue houses—those who sell their goods entirely by catalogue, but state specifically and positively that *they do not sell to the consumer*, but, instead, invite trade from the merchants only. Who has objections to such concerns? Has the jobber? If so, why should he have them? It appears to me that he has the advantage over such catalogue houses, for his salesmen, when on the road, have the personal acquaintance of the retailer; in most instances he is on very friendly terms with the retailer; he does him favors in one way and another, and his very presence gives him an advantage, at equal prices, over the merchant that sells by catalogue, for he can either meet or cut under the catalogue prices if he wishes to. If he does not, is the catalogue any greater competition with him than the traveling man from some other jobbing house? Traveling salesmen generally have some freedom in making prices, and they usually avail themselves of it.

Some of our largest and reputable wholesale Hardware houses boast that their "mail orders" are both numerous and large, and they attribute that to their attractive catalogues and discount sheets applying to same.

To this extent are they not in the same boat with other "catalogue houses," who sell to the merchant trade?

These are a few facts, and there may be many more which should be taken into consideration when discussing "catalogue houses."

I shall be very much interested to hear the subject discussed at Atlanta, and out of it I sincerely hope that something shall come which will be mutually satisfactory to all interested parties.

From Manufacturers Who Quote Only High Prices to Catalogue Houses:

We have given the catalogue house question little attention for some time, as we have had no correspondence with them lately. We are one of the manufacturing concerns that did not refuse to sell them, but the price we quoted was too high to bring business—just what we desired.

We have never refused to sell any good house, but we have asked prices that prevented catalogue houses from buying our goods, and are free to say that we are no friends of that method of doing business, believing it interferes with legitimate trade and is rather sharp practice.

We seem wedded to the jobber, and feel that merchants should be protected by the manufacturer; in our opinion the interests of the manufacturers and jobbers are identical and they should work together.

From Manufacturers Who Refuse to Sell Catalogue Houses:

Regarding the subject of catalogue and mail order business, we would say that we have never had any experience in this method of doing business. We will not sell our goods to parties who solicit orders in this manner, and there no question at all in our minds that any manufacturer makes a mistake in marketing his goods in this way who desires to reach the trade through the jobber and retailer as well.

From a Prominent Hardware Merchant as to the Possible Outcome of the Mail Order Business:

It strikes me that the manufacturers, jobbers and retailers should be united in their policy hostile to the mail order system. Otherwise they will have to either go into the mail order business themselves or the more prosperous retailers of the country run small jobbing establishments in order to hold their own under the competitive conditions.

BUTLER BROS.' NEW BUILDING.

BUTLER BROS., wholesalers of general merchandise to dealers only, entirely through the medium of their "Our Drummer" catalogue, have just undertaken a radical departure in the conduct of their Eastern trade. The bulk of their business will, it is expected, after next November be handled at a depot or warehouse in Jersey City, the contract for the erection of which has just been closed. The site of the building is about three blocks from the Pennsylvania Railroad depot, facing on Washington, Warren, Bay and Morgan streets. This building will be of the very latest and most approved construction, and will have floor space of nearly 600,000 square feet.

The welfare of employees has been carefully studied, and the new structure will contain club rooms, restaurant and roof garden for the employees generally, and a retiring room for the women clerks.

It will be recalled that about two years ago a similar move was made in Chicago, when they erected two immense structures just across the Chicago River, at the Randolph street bridge, which, while being on the north side, and on the outskirts of the original business section, is still in close touch with the older part of the city. The volume of trade in New York long since outgrew their enlarged facilities here, including a large storehouse on West street, 300 feet long. When the Jersey City building is ready all the storing of stock, packing and shipping of orders, bookkeeping and cashier's departments, with the necessary force, will be concentrated there. The building at 495-497 Broadway, New York, built for them 12 years ago, has eight stories, and two basements running through to Mercer street, they also occupying most of the adjoining building at 491-493 Broadway. The

Broadway building, or a similar one, will be used in this city in which to properly sample and display goods, provide suitable accommodations for house salesmen, buyers, customers and the company's officials.

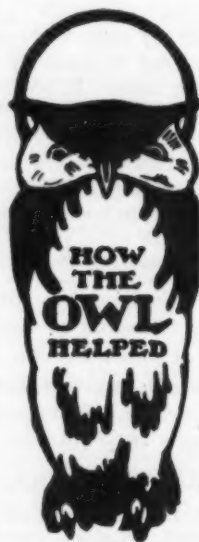
Besides the two large houses in Chicago alluded to, the company have a St. Louis branch at 1221-1237 Washington avenue, and sample rooms in the heart of the business section of St. Paul at 379-381 Sibley street. The lines of goods carried are handled by more than 50 departments, including Hardware, Tinware, Housefurnishing Goods, Glassware, Woodenware, Jewelry, Dry Goods, Clothing, Fancy Goods, Books, Stationery, &c.

SPECIAL TRAIN TO ATLANTA.

IN connection with the manufacturers' and jobbers' conventions at Atlanta, May 24-27, A Eugene Bolles, manager of *Hardware*, New York City, is getting together a special party to make the trip. The party will comprise Hardwaremen from New York and the East, reservations having already been received from a number of leading manufacturers, and present indications point to the probability of making up a party sufficiently large to warrant the chartering of a special train. Those who desire to avail themselves of this opportunity should make early application for reservations. The plan at present is to leave New York, Twenty-third street, Pennsylvania station, at 4.25 p.m., Sunday, arriving at Atlanta at 3.55 p.m. next day.

A TRADE WINNING BOOKLET.

CHURCHILL-HEMENWAY COMPANY, Galesburg, Ill., have lately issued an interesting booklet bearing the title "How the Owl Helped." The owl as a symbol of this company's business is well known to the Galesburg public, appearing as it does on their letterheads, billheads, booklets, circulars, &c., and also occupying a conspicuous position on their store front; on its



You must live with your furnace every day.

What you need to make your little home a paradise on earth—although heat has not otherwise been considered essential to a paradise—is a furnace that gets out of the coal all the heat there is in it, and sends that heat up into the house where it will do good—not out into the cold world to warm the atmosphere.

We have a furnace that is prodigal of heat but parsimonious.



"We have a furnace that is prodigal of heat."

breast appears the motto, "We never sleep." The latest booklet issued by the company, a page from which, and also the front cover, are reproduced herewith, reduced about one-half, is intended especially for the perusal of newly married couples. Every night in the local papers of the city a list is given of persons taking out marriage licenses in the county the day before. One of these booklets is mailed promptly to each of these parties, the idea of the company being that if they can get their trade at the launching of the matrimonial venture they stand a good chance of holding it subsequently. While the booklet has been in commission but a short time, we understand that it has proved itself a winner and a good advertising investment.

Mutual Hardware & Implement Company have succeeded W. G. White in the retail business at Mutual, O. T.

FACTORY COST AND BUSINESS METHODS.

ENCOURAGING EMPLOYEES TO MAKE SUGGESTIONS.

THIS is a matter which has doubtless received more or less attention from manufacturers, as the desirability of having the intelligent co-operation of employees is at least theoretically recognized. In many factories valuable suggestions are from time to time received from the workmen, especially those who are somewhat above the prevailing level in the matter of interest in their work, and in the intelligence which is so closely connected with that spirit. From the mass of employees, as a rule, comparatively little in this line is expected as the work is done in a routine and perfunctory manner, little thought being given to it and little interest taken in finding or reporting improvements or modifications in methods. Some manufacturers have endeavored to draw out from their workmen suggestions of this character. They have done this both for their own sake and for the sake of the men. The results have not always been encouraging, and in the letters given below reference is made by some of our correspondents to their failure in efforts looking in this direction. On the other hand, the experience of some manufacturers has demonstrated that a good deal can be accomplished in cultivating an intelligent co-operation on the part of the men and in securing from them suggestions of value. These points are best illustrated in extracts from letters from Hardware manufacturers who have given the matter attention.

UNSUCCESSFUL EFFORTS TO SECURE SUGGESTIONS.

From Manufacturers in Illinois: Some years ago we undertook to interest our employees in a scheme of this kind, offering prizes for the best suggestion, and much to our chagrin we failed to receive a single suggestion. **The Workmen Suspicious** We could not believe that not a single employee had an idea of his own, but were impressed with the belief that they looked upon the scheme as one to reduce costs and a consequent reduction of the number of workmen employed.

From Manufacturers in Indiana: We have at different times endeavored to encourage our employees to make suggestions, but always with little or no resulting success. In the ordinary small factory, as compared with the huge establishments operated by departments, employees of more than average intelligence are the exception, and usually consist only of the foreman and one or two assistants. **Lack of Intelligence** These, of course, are in touch with the office, and are mutually concerned in discussing and suggesting improvements all the time. On the other hand, the employees for two reasons show no development. First, through want of that superior intelligence which did they possess would take them out of the shop, and, secondly, because a man who does the same thing continually comes to think the regular way is the only way. One is sometimes thunderstruck over the want of thought and creative ability possessed by the ordinary mechanic, as he will often do a thing in a laborious way, and do it for weeks, without taking a short cut seen by his employer at a moment's glance. We have offered prizes for valuable suggestions, to only find that our men would take time from their work to ponder over inane and foolish ideas. Different conditions prevail in different shops. We believe the average American to be in intelligence above the average in any other nation, but want of education and the training of the mind keeps the average American workman in one position without change.

From Manufacturers in Illinois: We have had some experience in the matter of suggestion boxes. We

equipped our plant something over a year ago with attractive mail boxes conveniently arranged in every department and properly labeled "Suggestion Box." We also wrote a circular letter to our employees, placing same in their envelopes on pay day, stating fully the object of the arrangement, and stating that

An Unsuccessful Experiment where suggestions were made that were of any importance proper recognition would be made of same;

also if any suggestions were made that were a real improvement the same would be taken into account in the matter of salary, &c. We are very sorry to say that the suggestions found in these boxes were of very little importance; in fact, some of the men suggested closets in which to hang their coats and such nonsensical ideas. We have come to the conclusion that there are very few men who have any suggestions to offer regarding their work. It is really a sad commentary, and we have decided that we shall have to look to ourselves mainly for suggestion and secure brighter and better men as far as possible in every department. We are sorry to say that since the labor trouble there is less interest and fewer suggestions, more imperfect goods, and last, but not least, less product; and we feel justified in laying this mainly at the door of the union, which is continually poisoning the minds of the men. We are sorry that we cannot make a better report. However, we are not discouraged. We shall keep at it until we discover a remedy that will bring about the desired results.

SUCCESSFUL IN SECURING SUGGESTIONS FROM EMPLOYEES.

The letters which are given below report more satisfactory efforts, and show that valuable suggestions may be obtained from employees while at the same time they refer to methods by which suggestions may be encouraged and rewarded:

From Manufacturers in Massachusetts: We offer no premium to the average workman for suggestions in his line of work, but we are very close to our foreman in each department, and any suggestions from them that we adopt we try to remunerate in a satisfactory manner, either by an advance of wages or a cash payment

From Manufacturers in Indiana: We have done considerable along the line of encouraging suggestions from our men, but we have no system of prizes or other regular method of procedure. We have endeavored to cultivate a sort of *esprit du corps* among our employees, but in the factory and office, and while we have not offered prizes for suggestions, we have endeavored to acknowledge in some suitable way any such suggestions or improvements which we have adopted. We find that as a rule our men who exercise their ingenuity in the way of inventing improved processes or tools are quick enough to recognize their value and duly impress the same upon us. It is, of course, only human nature that they should often overestimate the value of such improvements, and, as a result, the amount of money which we have paid to our employees is quite a large sum every year. We do not know very much about the methods used by other manufacturers, either here or elsewhere, but we believe that a neighboring concern have had a system of conferences with the heads of departments which they consider productive of good results.

From Manufacturers in Massachusetts: Some of the most valuable devices we use in the production of our goods came from our men, those working on the different parts. It would be extremely interesting for those interested to see how many labor saving devices are in use in our works, all the work of different employees. We appreciate and encourage this thing all we can.

From Manufacturers in Rhode Island: It is safe to say that the managing men in this concern are loyal to

its interests, and the great bulk of the rank and file are just as loyal as they to the interests of this company. If this statement of writer's is correct, you can readily see that there would need to be no encouragement offered nor inducements held out to receive information from any one of them that would be of any service to us. This is a matter that we have never given any thought to, for the reasons stated above. That those who bring us patentable inventions or valuable information are rewarded goes without saying.

COLDWELL LAWN MOWER COMPANY'S SYSTEM OF PRIZES FOR SUGGESTIONS.

The following letter from Coldwell Lawn Mower Company, Newburgh, N. Y., will be read with special interest in this connection. It touches upon the method pursued by this company to encourage their workmen in the making of suggestions, and shows the gratifying results which have attended their efforts in this direction:

In answer to your inquiry regarding the success of offering prizes to our workmen for giving suggestions for improvements in anything about the factory, we wish to say that after two years' experience we find it a great success, and the results very satisfactory. Our plan is: We offer prizes from \$2 to \$25 for the 11 best suggestions for improvements in anything about the factory. These suggestions are written out and placed in an envelope (without signature) and deposited in a box. Every six months we examine these papers and pick out the 11 suggestions which we consider the best and award to each a prize according to their value. Then we number the suggestions and paste them up on a

Bulletin Board bulletin board. Each man recognizes his own suggestion and produces a duplicate copy of the same, with his name attached, and receive the prize that has been awarded to him. This avoids showing any partiality in distributing the prizes. The first six months we had 11 suggestions, just enough to take all the prizes offered; in the fourth six months we had over 70, and they came from men who had shown no marked ability in the line of inventive genius previously. Of course, many of the suggestions are not practical, but we always get some good ones out of the lot.

The plan keeps the men thinking; they are continually on the alert for anything which will enable them to get out work better or quicker. They are more interested in their work, and it brings them more in touch with their employers. They feel they have an interest beyond simply work and wages. Since we adopted this plan there has also been a marked improvement in our tools and machinery, and the general facility for getting out work. We started this plan with a view to benefiting our employees, but we find from experience that, looking at it from a financial standpoint, it pays; we get more out of the suggestions than the amount we pay out in prizes, but this is only a secondary consideration; the great improvement in both the quality and

Benefits to Factory and Workmen quantity of our production far outweighs every other consideration. On the other hand, the money our men receive in prizes is but a small part of the real benefit they derive from the scheme. It teaches them to think; it stimulates what inventive genius they may have; it demonstrates also that if at first they show but little ability in this line that little can be cultivated and educated by experience to an unlimited extent. Experience leads to the conclusion that inventive genius can be cultivated and improved and educated just as well as a genius for mathematics, or painting, or any other art or science.

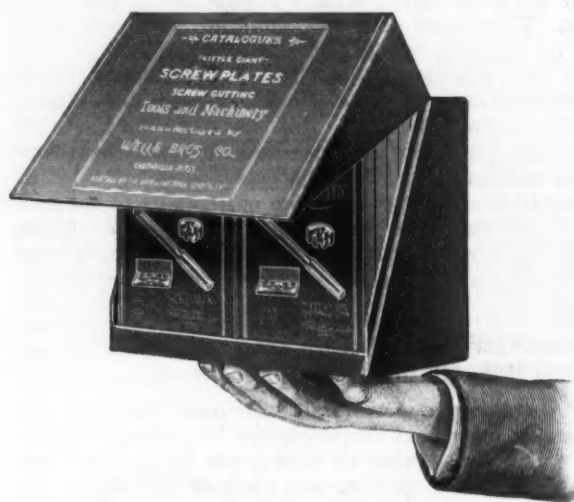
STRONG & TROWBRIDGE COMPANY.

STRONG & TROWBRIDGE COMPANY, 21-24 State street, New York, exporters, have opened their own branch houses in Constantinople, Turkey, and Cairo, Egypt, under the direct supervision of Benjamin O. Hough, formerly with the New York house. Mr. Hough

has had a wide experience in foreign trade, especially the Oriental portion, and particularly in the Levant or Eastern Mediterranean. The business will be conducted along American lines in an energetic way. This house is the first, it is said, to meet European competition in this manner, which is regarded as the only way to successfully compete. The Black Sea Russian, Grecian and Asia Minor trade will be handled from Constantinople, and the Egyptian, Soudan and other business in that territory will be controlled by the Cairo house.

CATALOGUE CABINET.

Wells Bros. Company, Greenfield, Mass., are prepared to furnish hardware merchants, free of charge, the improved catalogue cabinet represented herewith. This affords a convenient place for keeping a stock of the company's catalogues, which illustrate their latest improvements in screw cutting tools and machines. The company state that they adopted the method some time ago and have found it to be not only a convenience to



Catalogue Cabinet.

the dealer, but a great saving in catalogues. It also serves as an advertisement of the company's products, the cabinet having their card printed on the outside, as shown. The case is cloth covered, has swinging cover and contains about 40 catalogues. The inside dimensions are 8 x 7 x 5 inches. The company are anxious that all dealers who are interested in the line of screw cutting tools they make should have one of these cabinets on the counter, to enable their customers to arrive at the price of the different styles of tools illustrated, and also to interest their clerks in them, thereby giving the company an opportunity to place their products on the merchant's shelves.

EMERY WHEELS.

L. BEST, 45 Vesey street, New York, sales agent for the Sterling Emery Wheel Mfg. Company, Tiffin, Ohio, invites the attention of the trade to his extensive and widely assorted stock of Emery Wheels. Mr. Best keeps on hand constantly about 25,000 Emery Wheels, receiving from the factory two shipments a week for sorting up and replenishing broken lines, the sizes ranging from 1 to 36 inches in diameter, all thicknesses. Many special wheels are carried for universal and water tool grinding, including beveled and round face wheels for grinding saws and wood working tools. There are also constantly on the premises emery wheels for machine shops and foundries in wide assortments and adequate quantities. The Sterling Company make a feature of manufacturing special Emery Wheels of all kinds promptly to order, and, in the case of some representative concerns regularly using certain kinds of wheels, have a sufficient number always in store in anticipation of sudden demand.

Oklahoma Retail Implement and Hardware Dealers' Association.

THE Oklahoma Retail Implement and Hardware Dealers' Association was organized at a meeting held in the County Court House, El Reno, O. T., on the 19th and 20th ult. The meeting was called to order by Mayor Chas. P. Lincoln of El Reno. J. W. Freeborn was chosen temporary chairman, and H. W. Compton, temporary secretary. The visiting merchants were then welcomed to the city in graceful addresses by Mayor Lincoln and J. E. Jones, president of the El Reno Chamber of Commerce. On behalf of the Hardware and Implement dealers an appropriate response was made to these addresses by O. A. Smith of Watonga. Mr. Freeborn then called upon J. E. Baird, editor of the *Implement Trade Journal*, of Kansas City, who made a brief address on the subject "Why Dealers Should Organize."

Organization Committee Report.

The Committee on Organization, consisting of O. A. Smith, W. E. Davis, S. E. Haggard, E. C. Stretch and Geo. W. Compton, reported as follows:

We, the Committee on Organization duly appointed to present plan of organization of the Oklahoma Retail Implement and Hardware Dealers' Association, beg to submit the following report:

1. The name of this association shall be the Oklahoma Retail Implement and Hardware Dealers' Association.
2. The officers of this association shall be president, first vice-president, secretary, treasurer and territorial vice-presidents to be selected one from each county; an advisory board of five members, a Board of Directors of seven members, and a Legislative Committee of five members.
3. That said organization shall be a chartered organization.
4. Your committee suggest the following officers for the current year and until the annual meeting, which shall be held on the third Tuesday in November, 1904, to wit:

PRESIDENT, O. A. Smith, Watonga.
VICE-PRESIDENT, W. L. Perkins, Granite.
SECRETARY, J. W. Chenoworth, Leger.
TREASURER, S. E. Haggard, El Reno.

TERRITORIAL VICE-PRESIDENTS.

C. P. Hamilton, Mangum, Greer County.
A. C. Lucas, Hobart, Kiowa County.
C. W. Amspacher, Apache, Caddo County.
Robt. Lutz, Cordell, Washita County.
Walker R. Payne, Clinton, Custer County.
N. B. Nutt, Elk City, Roger Mills County.
H. M. Herma, Taloga, Dewey County.
O. N. Minton, Gage, Woodward County.
C. O. Greene, Alva, Woods County.
Mr. Bixler, Hitchcock, Blaine County.
C. B. Cowles, Enid, Garfield County.
Frank Banker, Kingfisher, Kingfisher County.
C. Kimmel, El Reno, Canadian County.
T. J. Griffith, Oklahoma City, Oklahoma County.
W. H. McCormick, Perry, Noble County.
F. A. White, Manchester, Grant County.
A. Levick, Ralston, Pawnee County.
Wm. McVickery, Blackwell, Kay County.
C. V. Litter, Guthrie, Logan County.
Carter Tracy, Beaver, Beaver County.
J. N. Johnson, Chandler, Lincoln County.
Frank C. Woodward, Maude, Pottawatomie County.
J. L. Little, Lexington, Cleveland County.

ADVISORY BOARD.

J. E. Bonebrake, El Reno. L. L. Collins, Cheyenne.
J. B. Yunt, Ft. Cobb. W. M. House, Shawnee.
C. J. Chastian, Cleo.

DIRECTORS.

W. T. Funderburg, Mangum. V. D. Tinkelpaugh, El Reno.
J. L. Halstead, Cherokee. O. A. Smith, Watonga.
A. H. Smith, Arapaho. T. J. Griffith, Oklahoma City.
R. S. Frazer, Stillwater.

LEGISLATIVE COMMITTEE.

C. S. Watson, Pond Creek. P. T. Benbow, Lawton.
G. E. Johnson, Sayre. W. P. Packard, Guthrie.
J. W. Freeborn, El Reno.

On motion the report was adopted as read, and the chairman appointed Messrs. Railsback and Selfros to escort the newly elected president and secretary to their places. Mr. Smith made a short address on taking the chair, in which he said that he appreciated the honor which had been conferred on him, and would fill the office to the best of his ability. Mr. Chenoworth followed with an earnest appeal to the membership to support their officers and make the association a power in the land. Mr. Haggard also expressed his thanks for the confidence

of the dealers in selecting him as treasurer of the new organization.

Constitution and By-Laws.

J. A. Goodwin, J. S. Chenoworth, D. D. Railsback and Alva George, committee appointed for that purpose, submitted the following constitution and by-laws, which were on motion adopted:

ARTICLE I.

Section 1. The name of this association shall be the Oklahoma Retail Implement and Hardware Dealers' Association.

ARTICLE II.

Sec. 1. The purpose of this organization shall be the promotion of the interests of the retail Implement and Hardware dealers of Oklahoma Territory, and to secure their friendly co-operation in all matters pertaining to their welfare.

ARTICLE III.

Sec. 1. Any person of good standing and who is engaged in the retail Hardware or Implement business in Oklahoma or Indian Territory may become a member of this association when recommended by a majority of the Executive Committee and upon payment of the membership fee and annual dues prescribed in the by-laws of this association.

ARTICLE IV.

Sec. 1. Each member shall be entitled to a certificate of membership bearing the official seal of the association, signed by the president and secretary, and shall designate on its face the name of the person to whom it is issued and shall grant the privileges of the association to such person.

Sec. 2. Each member shall pay a membership fee of \$1 and also annual dues to the amount of \$2, payable annually in advance, for the support of the association. Additional income may be secured by voluntary subscription made by the members of the association or citizens of Oklahoma Territory under the direction of the Board of Directors.

Sec. 3. The annual dues of each member shall be for the current year.

Sec. 4. Annual dues shall be due and payable three months before the annual meeting, and for negligence or failure to pay the same on or before the annual meeting such member shall be excluded from the privileges of the association. And for failure to pay dues for any cause for a period of six months after the date of meeting the certificate of membership in said association shall be forfeited.

Sec. 5. All resignations shall be made in writing and filed with the secretary, but if such resignation be filed after payment becomes due such member shall not be relieved from liability for such payment and shall not be permitted to withdraw honorably unless all dues are paid.

ARTICLE V.

Sec. 1. The officers of this association shall consist of president, vice-president, secretary, treasurer, an Advisory Committee of five members and a board of seven directors, and one vice-president to be selected from each county in the Territory. All of said officers shall be elected by a majority vote of the members of the association, except the president and secretary, who shall be elected by the Board of Directors at their annual meeting.

Sec. 2. The Board of Directors shall have the control and general management of the affairs of the association, and shall consist of seven members to be selected by the association at large. The Board of Directors shall also have the power to define the duties of all the officers, committees, agents or employees of the association, and in general to do such acts and adopt such measures not inconsistent with the by-laws of the association, and as they shall deem calculated best to promote the interests of this association.

ARTICLE VI.

Sec. 1. The Board of Directors shall hold regular meetings on the third Tuesday in November of each year. A majority of the board shall constitute a quorum for the transaction of business at any regular meeting.

Sec. 2. The Board of Directors shall submit a report of the condition and finances of the association at the annual meeting.

ARTICLE VII.

Sec. 1. It shall be the duty of the president to preside at all meetings of the association and of the Board of Directors. He shall perform all duties incident to the office, and shall advise the board to take such action as they deem likely to add to its usefulness and prosperity.

Sec. 2. The vice-president shall act in the absence of the president, and in the absence and disability of both officers a territorial vice-president to be chosen by the board shall act temporarily.

Sec. 3. It shall be the duty of the secretary to collect and record all information of value to the association; conduct official correspondence, preserve all books, records, documents and communications, collect all dues and pay the same to the treasurer, keep an accurate record of the proceedings of the association, its Board of Directors, and all committees.

He shall present a full report of the work of the year at the annual meeting, and perform all the duties incident to his office, subject to the supervision of the Board of Directors, and shall mail to each member a copy of the quarterly reports of the secretary and treasurer, and shall perform such other duties as shall be prescribed by the Board of Directors.

The secretary may also have the power to call an executive session of the Board of Directors and Advisory Board upon re-

quest of any five members of the association, for the purpose of placing before such executive session such matters as may be of immediate importance and that in his judgment should have immediate attention.

At the expiration of his term of office the secretary shall deliver to the Board of Directors all the books and papers and other property of the association which may have been intrusted to his care.

ARTICLE VIII.

Sec. 1. The Advisory Committee shall consist of five members, none of whom shall be members of the Board of Directors. Three members of such committee shall constitute a quorum for the transaction of business. It shall be the duty of the Advisory Committee, when duly notified by the president or secretary, to attend any meeting designated.

ARTICLE IX.

Sec. 1. The treasurer shall have the care and custody of the funds of the association and disburse the same only on the order of the secretary countersigned by the president. He shall keep all moneys of the association deposited in its name, and make annual reports to the Board of Directors.

ARTICLE X.

Sec. 1. Special committees may be appointed by the president at the request of the Board of Directors, and are subject to its approval.

Sec. 2. Reports of all committees must be submitted in writing and filed with the secretary. All committees shall submit reports to the association at each annual meeting, or as directed.

Sec. 3. A majority of any committee or joint committee shall constitute a quorum for the transaction of business.

ARTICLE XI.

Sec. 1. The annual meetings of this association shall be held on the third Tuesday in November of each year.

ARTICLE XII.

Sec. 1. The annual meetings of this association shall be held at its principal place of business and as provided for by the charter, and 30 members shall constitute a quorum for transaction of business.

Sec. 2. Special meetings of the Board of Directors, or of any committee, may be called at any time by the president upon written request of five members.

Sec. 3. Upon motion of any member, the association may by two-thirds vote go into executive session.

ARTICLE XIII.

Sec. 1. The annual election shall be held at the regular annual meeting of the association.

Sec. 2. All voting shall be by ballot, and each certificate of membership shall be entitled to cast one vote. No proxies shall be allowed.

Sec. 3. A majority of the votes cast shall constitute an election.

Sec. 4. The polls shall be open at such times during the annual meeting as the Board of Directors may designate.

ARTICLE XIV.

Sec. 1. The regular order of business at such meetings shall be as follows:

1. Call to order.
2. Roll call.
3. Reading minutes of last meeting.
4. Communications.
5. Reports of officers.
6. Reports of committees.
7. Unfinished business.
8. Election.
9. New business.
10. Adjournment.

ARTICLE XV.

Sec. 1. These by-laws may be altered or amended by a two-thirds vote of those present at any annual meeting, provided that due notice of such proposed change shall have been made by giving 30 days' notice.

Resolutions were also adopted expressing the thanks of the association for the numerous courtesies received from the merchants and other citizens of El Reno, after which the meeting adjourned *sine die*.

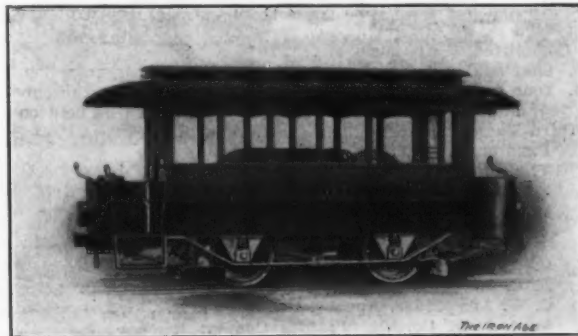
JOHN L. SARDY & CO.

JOHN L. SARDY, of John L. Sardy & Co., Saracen Chambers, Snow Hill, London, has been in this country for the past two or three months looking after the interests of his firm, who are the direct representatives of several American manufacturers. Among the important matters consummated by Mr. Sardy is the closing of a very large contract for supplying a leading line of goods to India. Mr. Sardy, who will soon be returning, has also concluded negotiations in regard to additional agencies. By the methods which this firm pursues manufacturers are kept in constant relation with their customers abroad, to whom the goods are invoiced directly, the London house securing the orders, attending to collections on the manufacturers' account and in other ways promoting their interests. This work is done on a commission basis,

the company bearing all the expenses of the office and the conduct of the business on the other side. Mr. Sardy, who was formerly a resident of New York, has many friends in this country, and the closeness of his relations with the trade is illustrated in the fact that he has recently become a member of the Hardware Club. In addition to the London office, the house have a branch in Paris under the style of Sardy et Cie, 3 Rue Laffitte.

MINIATURE THIRD RAIL ELECTRIC CAR.

IN connection with newspaper advertising and a window display of Electric Goods the John E. Bassett & Co., New Haven, Conn., operated the Electric Car shown in the accompanying illustration, for about a week in one of their show windows. The car was of the third rail type and ran on a circular track of 2-inch gauge, 15 feet in circumference. The third rail was parallel with the track, the electric current being conveyed to the motor by a small shoe connected to the car, and sliding on the rail as the car traveled. The current was taken from the city lighting circuit, of 110 volts, and was reduced to about 7 volts by passing through jars of a solution of sulphuric acid and water, in which were pieces of sheet lead. The car measured 10½ inches in length, and with the motor weighed 2½ pounds. The wheels, trucks, frame, brake, shoes and rods were of finished brass, while the upper work was of polished cherry with brass trimmings and glass windows. Miniature pea lamps were used for



Miniature Third Rail Electric Car.

inside lighting, with the same kind for the regulation lamp in front and rear of car for lighting the track. A small cut off switch overhead of the rear of the car controlled the current for the lamps, which could be turned on and off at pleasure. On the front platform was the controller box with its small handle, which, turned to the right, started the car, and reversed when turned to the left. Brake handles on the front and rear platforms connected by chains to the brake rods and shoes lessened the speed, and small brass scrapers were provided to clear the track of any obstruction, operated by handles on each end dashboard. The gearing from the motor to the front axle was of such size as to give the car proper speed. The car was constructed by Harry T. Brown, a 17-year old pupil in one of the New Haven high schools. The whole make up was modeled after the style of the ordinary trolley car, and the workmanship and design showed much care and thought. The car attracted a great deal of attention and the firm believe that it was a success as an advertising medium.

MAY 16 will be the fiftieth anniversary of the election of William H. Hart as an officer of the Stanley Works, New Britain, Conn., as on May 16, 1854, he was elected secretary and treasurer of this corporation, of which he is now the president and treasurer. As one of the most widely known and highly honored of our Hardware manufacturers Mr. Hart will doubtless be the recipient of many congratulations and kindly expressions on the completion of his half century of official identification with this company, who have, during this period, grown to a business of so much prominence in the trade.

NEW ORLEANS NOTES.

SINCE April 1 basic material, through its decided upward movement, has affected the heavier Hardware throughout the country, and, of course, New Orleans has felt the effect in common with other markets. However, traders agree that the changed price-lists have not varied the trend of trade. Customers have continued to buy in exceptional quantities, and have continued to do a very large proportion of the business upon short time or with a discount for cash. The desire for the article, not what the article was to cost, has been the deciding element in the bulk of purchases. Such is the result of prosperity current through the agricultural lands upon which New Orleans depends for its trade. The store of cash through the rural districts seems not to have been absorbed either by investments in realty and improvements or by expenditures upon the new crops.

Themes of discussion among dealers in New Orleans have been the new Mexican tariff, the effect of reciprocity with Cuba, and the continued developments in transportation circles, which promise greater facilities for distribution. A number of important developments are reported to be scheduled with the big wholesale houses of the city in the way of new headquarters and warehouse equipment.

Growth of Country Markets.

What the dealers are congratulating themselves upon is that while they are energetically reaching for the "bird in the bush" in the shape of the near by foreign markets and the more distant domestic markets, the "bird in hand" of the usual trade through Mississippi, Louisiana, Eastern Texas and Western Alabama and Florida gives fair promise to be as plump and luscious as was the one held last season. Reports from the cotton, the rice and the sugar lands, as well as from the lumber regions, are glowing. The cotton crop is in the ground, has sprouted in most instances, and the cotton planters' credit was never better. The acreage is estimated to be about 10 per cent. larger than last year, but this is deemed not sufficient to overstock the market or knock prices to starvation levels next season. The rice men are organizing to regulate and handle their crop, to extend their market, and to reach for new customers and new markets. The saw mills are running extra time, and the cane farmers have had the best planting and sprouting season since 1888. In consequence of all this the jobbers in the country towns and smaller cities commanding the sections influenced by these lines have had their hands full supplying the rush orders from planters, filling the shortages resultant from precautionary economy during the late winter. A notable feature has been the increase in the stocks carried in many of the towns.

Agricultural Implements and Building Hardware have outstripped other lines to the domestic trade. The former has continued after the usual close of the rush season, by reason of the "afterthought" purchases of the planters when the crop outlook became so rosy late in March and early in April. The last named line continued to grow and develop with the coming of spring to meet the demand of the unprecedented boom in building operations throughout the Middle South and the cotton belt.

In building lines Sheet Roofing, although affected considerably by the increase of prices April 1 and again April 15, has led other sorts of Building and Structural Hardware. The demand is excessive because of the country prejudice against slates, and the desire to have something fire proof or approximately so in the new towns. General Building Hardware demanded is of a better grade than usual through the country. With and through all this a cannonade of Nails has been kept up along the railroads leading out of New Orleans that has been deemed remarkable. It would seem that every loose fence picket, every sagging floor, every flapping shutter in all the land about New Orleans must by this time have been most securely nailed down. Only one other feature of the trade has had the human interest attached that has gone with this flood of Nails. This has been the demand for Trace Chains. In this line it would seem that every

farmhand from Tennessee to the Gulf and from the Blue Ridge to the Staked Plains had thrown away his rusty traces and purchased others bright and shiny enough to reflect the owner's new prosperity.

Mill supplies have been peculiarly and pleasantly active, but not exceptionally so. Several weeks ago it was reported that a number of the mills would soon shorten their hours to curtail output. This has proven to be erroneous. Those mills which were to shorten time did so to allow certain repairs that could be accomplished this way. A number of new mills recently established in the Mississippi district have made their outfit purchases in New Orleans. Recently a number of the larger lumber companies of Mississippi and Texas have removed their headquarters to New Orleans, and this is deemed an extension of the New Orleans market, for the companies will hereafter make their purchases more exclusively in this city than heretofore.

Building trades strikes have practically killed for the time being local demand for Building or Structural Hardware or for Tools and Builders' Supplies. However, whenever the pending strikes are settled, it is known that a season of tremendous activity is before the trade. Over \$6,000,000 of large building will be done, including at least \$2,000,000 of residences, small stores, &c. City household Hardware for the summer trade is opening up. Summer supplies of all sorts are going out from the retailers in considerable quantities. New Orleanians are finding that with the proper equipment of Electric Fans, Refrigerators, Cream Freezers, Mosquito Netting, &c., summer life down here is bearable, and cheaper than hunting Canadian or seashore summer resorts. Ship Chandlery has been injured by the dropping off of the export business in corn, wheat and other grains by reason of the war prices in the United States, and by the diminution of the cotton export business through the short crop. Generally speaking, the retailers of the city have prospered, but not in quite the same degree with the wholesale merchants.

Transportation and Export Developments.

Within ten days the Frisco and the Louisiana Railway & Navigation Company, both new roads, which are to give New Orleans access to hitherto virgin soil in Northern Louisiana and Eastern Arkansas, have completed the purchase of their respective river front terminals along the New Orleans commercial front. Both roads are working rapidly to complete their trackage into New Orleans in time to avail themselves of the exemption from taxation for ten years upon all property completed before July 1, 1904. The Louisville & Nashville Railroad is said to have arranged for a line of steamships from New Orleans to Central and South America, with New Orleans as the terminal point.

The wholesale dealers in Hardware, grain and dry goods have gotten together in part upon the establishment of a steamship line from New Orleans through the lakes back of the city to the West Florida ports. Those who in Hardware lines have guaranteed a certain tonnage for the line are A. Baldwin & Co., Stauffer, Eshleman & Co., W. A. Seago, chip chandler; Interstate Electric Company, Ahrens & Ott, mill supply men; Simonds & Co.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us duplicate copies of catalogues, price-lists, &c., one copy for our Catalogue Department in New York and another for our London office; and at the same time to call our attention to any new goods or additions to their line, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

S. W. CARD MFG. COMPANY, Mansfield, Mass.: The company have issued an attractive catalogue and price-list of nearly 100 pages devoted to their line of Taps and Dies, Screw Plates, Die Stocks, Tap Wrenches, &c.

THE SMITH & HEMENWAY COMPANY, 296 Broadway, New York: Sixteen-page supplement to their "Green Book of Hardware Specialties," which includes goods which are

entirely new, as well as goods new to them as manufacturers, but staples in the trade.

ANCHOR POST IRON WORKS, formerly the Anchor Post Company, 15 Cortlandt street, New York: Steel Fence, Posts, Wrought Iron Railings and Entrance Gates, Back Stops for Tennis Courts, Poultry Runs, Game Enclosures, Tree Guards, Garden Appliances, &c.

N. R. DAVIS & SONS, Assonet, Mass.: Hammerless Guns, single and double barrel, in various grades. The catalogue states that their business was established by Mr. Davis in 1853 and that the product embodies all the latest improvements in the construction of first class Guns.

DANA & Co., Cincinnati, Ohio: "Seeds" is the title of an envelope which they are mailing to retail merchants in the interest of their Peerless Iceland Freezers. The "Seeds" are a dozen miniature cards referring to the special features of the Freezer and the profitableness of handling it. They are designed to supplement the jobbers' efforts in selling the goods.

THE KRAMER BROS. FOUNDRY COMPANY, Dayton, Ohio: Sewer Castings and Plumbers' Supplies, Stove Linings, Emery Grinders, Wagon Jacks, Grate Bars, Lawn Vases, Hardware Specialties, &c.

PRICE-EVANS FOUNDRY COMPANY, Chattanooga, Tenn.: Architectural Iron Work and Specialties, Lawn Furniture, Sash Weights, Cast Iron Washers, &c.

SCHREIBER, CONCHAR & WESTPHAL COMPANY, Dubuque, Iowa: Want book for customers, the right hand pages being ruled for entering goods wanted and the left hand pages illustrating various Hardware articles. Freight rates from Dubuque and Chicago, also the Western and Iowa freight classifications are given. Included with the freight classifications are the average weights of goods usually shipped in original packages.

GOODSELL MFG. COMPANY, Greenfield, Mass.: Leaflet illustrating and describing the Goodell All Steel Miter Box, Goodell Improved Cutting Off Tool and Goodell Improved Bell Centering Punch.

THE JACOBS MFG. COMPANY, Hartford, Conn.: Circular in the interest of their Jacobs Improved Drill Chuck, which is referred to as powerful, accurate and fully guaranteed. It is accompanied by facsimile testimonial letters from parties who have the Chucks in use.

THE BERGER MFG. COMPANY, Canton, Ohio: Catalogue illustrating Metal Furniture and Office Equipment, including Filing and Card Index Cabinets, Desks, Tables, Counters, &c.

THE CHARLES PARKER COMPANY, Meriden, Conn.: Catalogue of Vises, which are made of the semi-steel combination, which is referred to as making an exceptionally strong Vise. The company's new series of Vises, in addition to being made of semi-steel composition, has a solid steel bar running through the sliding jaw, making it practically unbreakable.

WEED & Co., Buffalo, N. Y.: Extra pages for insertion in their catalogue.

THE J. B. FOOTE FOUNDRY COMPANY, Fredericktown, Ohio: Catalogue illustrating Church, School, Fire, Engine and Farm Bells, Third Folding Buggy Seats, Hollow

U. T. HUNGERFORD BRASS & COPPER COMPANY, 497-505 Pearl street and 37-43 Park street, New York: Catalogue devoted to Brass-Bronze-Copper Pipe and Fittings for plumbing purposes, containing price-lists, tables of weights and measures, rules, &c., of value to architects, sanitary engineers and dealers in Plumbing and Engineering Supplies.

THE ROYAL POLISHED STEEL ROASTER COMPANY, Troy, Ohio: Illustrated pamphlets of Roasters and Bakers, and of Gas and Gasoline Ovens.

THE NEW DEPARTURE MFG. COMPANY, Bristol, Conn.; John H. Graham & Co., sole agents, 113 Chambers street, New York: New revised list of Plumbers' Brass Goods, March 5, 1904.

UNIVERSAL CASTER & FOUNDRY COMPANY, factory Newark, N. J., general offices 1170 Broadway, New York: Illustrated price-list of Pianoforte, Metallic Bedstead and Furniture Casters. This company, as the trade are aware, is a consolidation of the interests of the Standard Caster & Wheel Company, John Toler, Sons & Co. and A. B. Diss & Co.

TRADE ITEMS.

SIMMONS HARDWARE COMPANY, St. Louis, with a view to doing their part toward making the opening day of the World's Fair a success, closed all their stores and warehouses Saturday, 30th ult., so as to permit their employees with their families to be present at the initiatory exercises. To further facilitate the matter the company gracefully presented each employee with \$1, the price of two admission tickets to the grounds.

HENDRICKS & CLASS, manufacturers' representatives in various kinds of Hardware, including railroad, mine and ship materials, have removed from 150 Nassau street, New York, to 25 West Broadway. They handle Anchors, Blocks, Bolts, Chains, Forges, Bar Iron, Belting, Picks, Plows, Sledges, Wheelbarrows, &c.

THE METAL MFG. COMPANY, who were incorporated a short time since with a capital stock of \$10,000, paid in, have bought out and succeeded the Hotchkiss Mfg. Company, 106 Park street, New Haven, Conn. The new company will continue at the same address and manufacture Molding Hooks, Curtain Pole Trimmings, Upholstery Hardware, &c. E. J. Leffingwell is president and H. V. Eltonhead treasurer, both of whom having previously been engaged in business in New York City.

PACKARD HARDWARE COMPANY, Greenville, Pa., will celebrate their centennial on the 9th inst. The chief feature of the celebration will be a dinner at the new Hotel Speir, in the evening, to which a large number of their friends have been invited.

Revolving Four-Wheel Glass Cutter.

The Millers Falls Company, Millers Falls, Mass., and 28 Warren street, New York, are manufacturing the revolving four-wheel glass cutter No. 30, here illustrated. Each cutter wheel is pivoted in a quadrant of the circular head, and the head itself, $\frac{3}{4}$ inch diameter, is



Revolving Four-Wheel Glass Cutter.

Augers, Spoke Pointers, Saw Vises, Mend-a-Rip Outfits, &c.

THE THOMAS MFG. COMPANY, Springfield, Ohio: Illustrated catalogues relating to Drills, Harrows, Hay Machinery and Lawn Mowers.

DAIRYMEN'S MFG. COMPANY, Warren, Bay and Morgan streets, Jersey City, N. J.: Catalogue devoted to Sanitary Milk Cans, Ice Cream Cans, Dairy and Galvanized Specialties. The company also do special stamping and sheet metal work to order.

pivoted to the shank and held rigidly in position as each of the four cutters is used by a milled edge $\frac{3}{8}$ inch thumb nut on the reverse side. In the shank a round $\frac{1}{4}$ -inch stop is punched partially through the metal, which fits accurately into one of the four rectangular openings as the head is revolved, the opposite or end opening being used for severing the waste strip of glass when cut too close to break off by hand alone. The tool is finely made, is 5 inches long over all, with handle of cocobolo wood, nicked ferrule and polished working parts.

New Patented Sliding Door Hanger.

The hanger trolley of the sliding door hanger illustrated herewith, which operates on the inside of a hollow track, is roller bearing and is provided with four wheels, thus distributing the weight of the door on eight wheels.

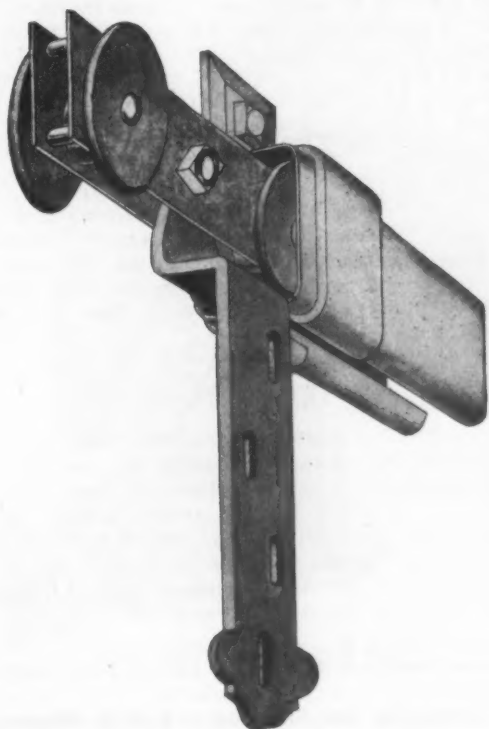


Fig. 1.—New Patented Sliding Door Hanger.

The hangers are arranged for vertical adjustment, Fig. 2, and the doors may be either raised or lowered by simply loosening the nuts. When in place the ends of the track are closed, preventing water getting inside of the track, protecting the moving parts from the weather and

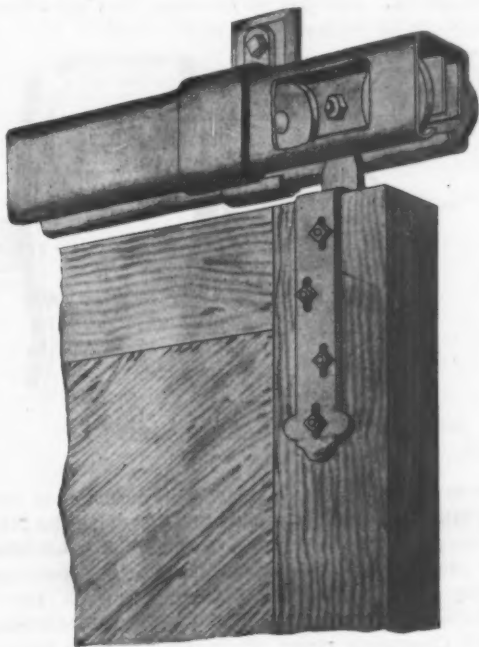
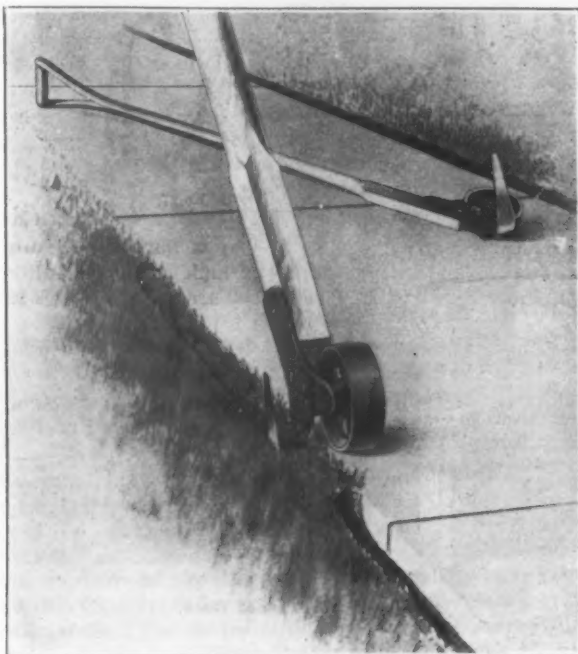


Fig. 2.—Showing Vertical Adjustability of Hanger.

obviating their deterioration through corrosion. The hangers are referred to as being especially adapted for stables, box cars, freight houses, platform gates, piers, &c. The New Jersey Foundry & Machine Company, 9 Murray street, New York, are manufacturers of these hangers.

Wemple's Trench Cutter.

A device that is intended for use in suburban residence districts and other localities where cement sidewalks are in vogue is illustrated herewith. It is known as Wemple's trench cutter. As will be seen by the illustration, the operator pushes the tool along the edge of the cement sidewalk and a U-shaped knife attached to the



Wemple's Trench Cutter.

tool cuts a trench 2 inches wide and 2 inches deep along the side of the walk. In this way the operator trims the lawn evenly within 2 inches of the walk and avoids the unsightly, straggly effect that is present when grass is permitted to grow close to the walk. Orr & Lockett Hardware Company, Chicago, are sole distributors of this tool to the trade.

The Gem Thread Cutter.

The thread cutter shown herewith is made of steel, nickel plated, with cutting edges on the inner surfaces of the V-shaped end. At the back of the cutter is a form



Gem Thread Cutter.

of safety pin for attaching the cutter to the front of ladies' waists. The cutter is designed to cut thread while sewing by hand to obviate severing the thread with the teeth or scissors. The device is being introduced by the H. C. Cook Company, Ansonia, Conn.

Ayrhart & Coshatt are successors to A. J. Ayrhart in the Hardware, Stove and Implement business at Dedham, Iowa.

Barn Door Latch No. 7.

In Fig. 1 of the accompanying cuts the latch is shown with the door closed, with opening in the catch for the use of a padlock. In Fig. 2 the door is shown open, with

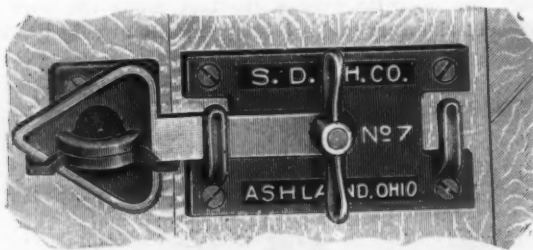


Fig. 1.—Barn Door Latch No. 7.

the latch turned back out of the way of harness, clothing and stock. The latch is made of high grade malleable iron, finished in japan. The latches are $2\frac{1}{2}$ x 7 inches in

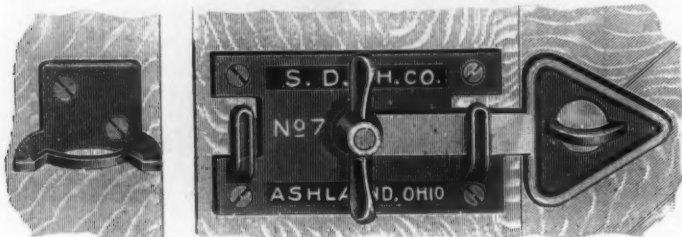


Fig. 2.—Latch Turned Back.

size, packed half a dozen in a box and $\frac{1}{2}$ gross in a case. The latch is put on the market by the Safety Door Hanger Company, Ashland, Ohio.

The New Blackstone Rotary Washer.

The Blackstone Mfg. Company, formerly Vandergrift Mfg. Company, Jamestown, N. Y., are offering the washing machine shown herewith. The legs are bolted to the tub with two heavy steel bolts in each one, and reinforced with a steel rod underneath. The legs, made of hard wood, can be removed if desired and replaced if



The New Blackstone Rotary Washer.

accidentally broken. The wringer box is large and is built into the top of the machine; this arrangement being referred to as a convenient one. The machine is fitted with all the company's latest improvements, and is nicely finished a mahogany red with aluminum castings.

Pelouze New National Postal Scale.

Illustrated herewith is an improved form of the old pattern of postal scale, manufactured by the Pelouze Scale & Mfg. Company, 118-132 West Jackson boulevard, Chicago, Ill. The scale is alluded to as having an attractive and ornamental base, while the uprights that support the platform are double instead of single, as before. The double uprights allow the weight to come immediately over the spring, to insure accuracy, no matter on what part of the platform the article to be weighed is placed. The principal advantage of the Pelouze postal scales, it is explained, is that the double needle index starts at the top and moves through a slot, pointing exactly to the information desired. The scale illustrated is especially adapted, on account of its accuracy and reliability, the

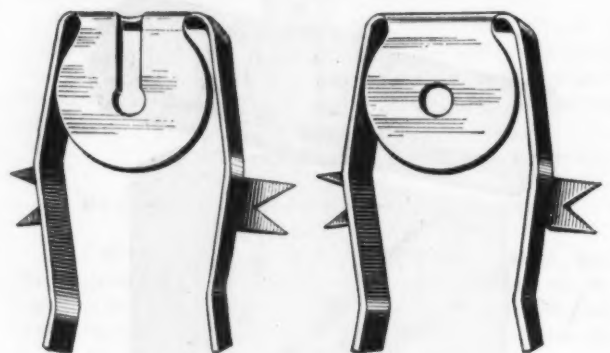


Pelouze New National Postal Scale.

makers state, for use in banks and large commercial houses.

The Notax Roller Bracket.

The roller bracket illustrated herewith is a new device for holding shade rollers in the runway of a window. The brackets are stamped from steel and are provided with sharp projections on each side which, when placed in position, hold the bracket firmly in the runway, above the pulley. Being of spring steel, they are adjusted



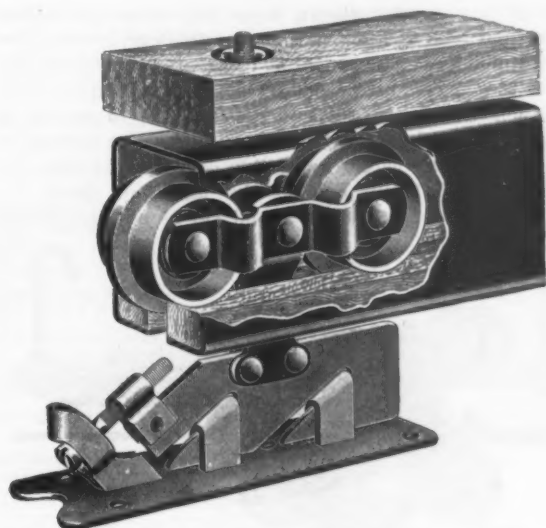
The Notax Roller Bracket.

to any size runway and can readily be inserted or taken down by simply pressing the ends together with the thumb and forefinger, no nails, screws, or tacks being necessary, as after placing in position the raising of the lower sash will force them firmly in position. Patents for the device have been applied for, and Charles M. Ghiskey's Sons, 508 Commerce street, Philadelphia, have been appointed sole selling agents.

Richey Hardware Company have succeeded Richey & Richardson in the Hardware, Stove, Farm Implement and Buggy and Wagon business at Sheridan, Ind. The firm have lately taken possession of new and larger quarters, where they are in excellent position to look after their growing business.

Richards' Royal Ball Bearing Trolley House Door Hanger.

Herewith illustrated is a new type of door hanger recently put on the market by the Richards Mfg. Company, Aurora, Ill. The hanger is fitted with tandem wheels, and each wheel is fitted with two sets of steel ball bearings running in an inserted ball cup. The track is made of No. 16 gauge steel, with hard maple strips which serve as tread for the wheels to make a noiseless runway. The track forms a complete cover for the hangers, preventing



Richards' Royal Ball Bearing Trolley House Door Hanger.

the admission of dirt or plaster to the runway or the bearings of the working parts. The track is attached to a wooden header at the factory by means of three adjustable screws for each piece, thus making it a simple matter for the buyer to set up his own hanger, as all parts are fitted and it is only necessary to fasten the wooden header to the ceiling support. The track is so constructed that it can readily be taken out and replaced at any time without injuring the wood work.

Iron Age Wheel Plow and Cultivator No. 19.

We illustrate herewith a wheel plow and cultivator placed on the market by the Bateman Mfg. Company, Box E, Grenloch, N. J. The wheel is 24 inches high, made of steel and runs easily on a pipe axle bearing. The frame is also of steel, while the handles are of oak and nicely finished. The working tools consist of a steel landslide

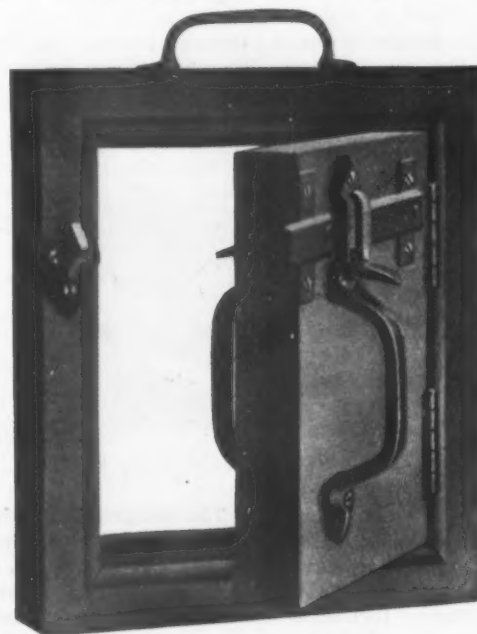


Iron Age Wheel Plow and Cultivator No. 19.

plow, riveted to a malleable iron back, two cultivating teeth of different widths, a sweep or scuffle hoe, all of which are of pressed steel, and a malleable iron rake 11 inches wide. These tools are all interchangeable, being held firmly in position by means of a set screw. The tool is light but substantial, and is made to sell at a low price. It weighs 21½ pounds complete, packed for shipment.

The Perfection Door Latch.

The door latch shown herewith is made of malleable and wrought iron, so as to be unbreakable. There are handles for both sides of the door, and the latch can be



The Perfection Door Latch.

used on doors of any thickness. The latch is especially valuable for use on factory doors, and on fire doors with brick jambs. The device is being put on the market by Wm. W. Scofield, 347 West Main street, Waterbury, Conn.

The Frost Queen Cream Separator.

Lawrence Mfg. Company, Toledo, Ohio, have just brought out the cream separator shown herewith. The process employed in operating the separator is known as the cooling or submerging system. In the construction of the cooling tank, which contains the water, heavy galvanized iron is used, while the milk compartments are made of XXX charcoal tin, enameled on the outside with aluminum to render it proof against the action of the



The Frost Queen Cream Separator.

water. Each milk compartment is fitted with the company's patented reversible strainer, cover and aerator, which forms not only a strainer, but when reversed acts as a dust and insect proof cover. The form of construction is referred to as being such as to insure perfect cooling of the milk and at the same time perfect cleanliness. All parts can be easily reached without removing the milk compartments from the water tank, yet provision has been made for so doing, if desired, by using for the connection a simple attachment which does not get out of order. In designing the separator the manufacturers' efforts were directed toward the production of an article, in the most simple manner, which would contain every feature necessary to insure the best results possible. The separator is made in six sizes, from 10 quarts, one cow, capacity, to 60 quarts, six to eight cows, capacity.

The Abernathy Quick Acting Vise.

The Abernathy Vise & Tool Company, 1264 Monadnock Building, Chicago, Ill., are offering the wood workers' vise shown in Figs. 1 and 2. Fig. 1 gives a front view of the vise, which is instantaneous in adjustment—that is, when the handle is in a vertical position the front movable jaw may be drawn or pushed to any desired ad-



Fig. 1.—The Abernathy Quick Acting Vise.

justment by a single motion. The compression feed is $\frac{3}{4}$ inch for each revolution of the handle, a feature to which special attention is called. If so desired, the front jaw may be fed the whole length of its adjustment by a continuous turning of the handle, but approximately one-fourth turn of the handle is all that is necessary to clamp an article for any ordinary purpose. The front jaw may also be pushed to an adjustment regardless of

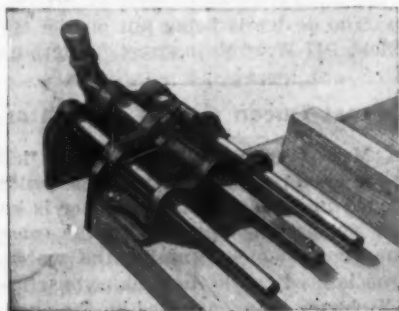


Fig. 2.—Bottom View of Abernathy Vise.

the position of the handle, which is often a convenience and a further saving of time. The simple construction of the vise may be seen in Fig. 2, which gives a bottom view. The compression is secured through the action of a broad faced spiral cam $3\frac{1}{2}$ inches in diameter and a single piece steel clutch, which, through the action of the cam, is immovably locked to the central compression bar. The bar is a perfectly smooth piece of square cold rolled steel. A substantial spiral spring, holding the clutch against the cam, completes the mechanism, which is positive in action

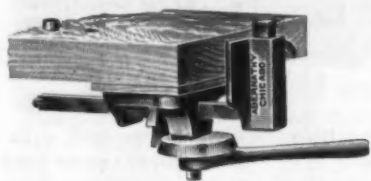


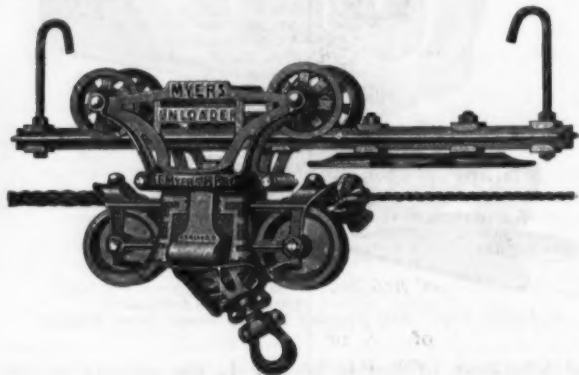
Fig. 3.—Abernathy Quick Acting Tail Vise.

at any point of adjustment. It is pointed out that there are no screws, nuts, racks, pawls, gear wheels, auxiliary shafts, levers or no combinations of these to secure the desired results, but that the entire manipulation of the vise is accomplished by the handle alone, and all working parts are located under the bench, where they are protected from knocks and dirt. The vise is made in two sizes: No. 1, the standard cabinet and pattern makers' size, and No. 2, the manual training school special. Fig. 3 shows the quick acting tail vise, made by the same company. Like the vise above described, it is instantaneous

in adjustment to any desired opening and the work may be clamped by a short movement of the handle, operated by a slight pressure applied in either direction. The vise is made entirely of metal, is easily attached to any bench and is provided with a metal dog adjusted by a thumb-screw. A feature of the vise where room is an item is that when closed it only extends $1\frac{1}{2}$ inches beyond the end of the bench.

Myers' Unloader Hay Carrier.

F. E. Myers & Bro., Ashland, Ohio, are offering the unloader hay carrier shown herewith, which combines the original idea of their O. K. reversible carrier and the Myers unloader. The machine illustrated combines the idea of the carrier referred to above, and in addition the large, open mouth has been widened so as to permit a larger range to the swinging fork pulley. The carrier is both swivel and straight reversible combined in one. It is explained that this enables the jobber or dealer to carry one style of carrier only and yet be able to fill all



Myers' Unloader Hay Carrier.

requirements, as the carrier can be reversed either by swiveling or by drawing the rope through from end to end, as the operator may desire. The unloaders are equipped with a double lock, which engages the knocker and fork pulley on either side of the frame. The advantage of the double lock lies in the fact that either one of the locks will hold the load independent of the other, a feature which is referred to as peculiar to this machine. The track wheels are fitted with turned steel bearings, $\frac{3}{8}$ inch in diameter. The rope sheaves revolve on steel bushings and are of a size to carry a full 1-inch rope, this being alluded to as unusual. Unloader and carrier are made of annealed malleable iron, all bearings are turned true on the lathe, and all wheels are fitted with oil openings. The goods are finished with aluminum bronze.

The Steady Coat and Hat Hook.

The accompanying cut illustrates a wire coat and hat hook recently placed on the market by the C. T. Williamson Wire Novelty Company, Newark, N. J. The hook is strong because, it is explained, the wires are double and parallel one with the other. These features, combined



The Steady Coat and Hat Hook.

with the coiled brace insure steadiness and strength. The sharp points and undercut threads enable the hook to be put up easily without the aid of any tools, and once up, it is remarked, it cannot be pulled out. The hooks are made on a generous plan, the so-called 3-inch measuring $3\frac{1}{4}$ inches. They are furnished in two sizes and four finishes. The manufacturers will be pleased to forward samples to merchants on application.

Current Hardware Prices.

REVISED MAY 3, 1904

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33 1/2 @ 33 1/2 & 10% signifies that the

price of the goods in question ranges from 33 1/2, per cent. discount to 33 1/2 and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued June, 1903, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Abrasives—

Adamite in Carloads:
 Crystal..... \$ ton \$90@100
 Grain..... \$ ton \$120@140
 See also *Emery*.

Adjusters, Blind—

Domestic, \$ doz. \$3.00..... 33 1/2
 North's..... 10%
 Zimmerman's—See *Fasteners, Blind*.

Window Stop—

Ives' Patent..... 35%
 Taplin's Perfection..... 35%

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Arm and Hammer, Wrought \$ 58 1/2 @ 64 1/2
 Blue Patent Trenton..... \$ 7 1/2 @ 9 1/2
 Eagle Anvils..... \$ 7 1/2 @ 9 1/2
 Hay-Budden, Wrought..... \$ 9 @ 9 1/2
 Horseshoe brand, Wrought..... \$ 9 @ 9 1/2

Imported—

Peter Wright & Sons..... \$ 10 1/2 @ 10 1/2

Anvil, Vise and Drill—

Millers Falls Co., \$18.00..... 15 1/2 @ 10%

Apple Parers—See Parers,

Apple, &c.

Aprons, Blacksmiths—

Hull Bros. Co..... 30 1/2 @ 5%
 Livingston Nail Co..... 30 1/2 @ 5%

Augers and Bits—

Com. Double Spur..... 75 @ 75 1/2 @ 5%
 Boring Machine Augers..... 66 1/2 @ 70 1/2
 Car Bits, 12-in. twist..... 60 @ 60 1/2 @ 10%
 Jennings' Pattern..... 50 @ 10 1/2 @ 60 1/2
 Ford's Auger and Car Bits..... 40 @ 5%
 Forster Pat. Auger Bits..... 35%
 C. E. Jennings & Co.:
 No. 10 ext. lip, R. Jennings' list 25 @ 10%
 No. 30, R. Jennings' list..... 40 1/2 @ 10%
 Russell Jennings..... 35 1/2 @ 10 1/2
 L'Hommiedieu Car Bits..... 15 1/2 @ 10%
 Mayhew's Countersink Bits..... 45%
 Millers Falls..... 50 @ 10 1/2 @ 7%
 Pugh's Black..... 20%
 Pugh's Jennings' Pattern..... 35%
 Snell's Auger Bits..... 60%
 Snell's Bell Hangers' Bits..... 50 @ 10%
 Snell's Car Bits, 12-in. twist..... 60%
 Wright's Jennings Bits (R. Jennings' list)..... 50%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's small, \$18; large, \$26..... 50 @ 10%
 Clark's Pattern, No. 1, \$ doz., \$26..... 50 @ 10%
 Ford's, Clark's Pattern..... 50 @ 10%
 C. E. Jennings & Co., Steer's Pat..... 25 @ 10%
 Swan's..... 20%

Gimlet Bits—

Common Double Cut, gro. \$3.00 @ 3.25
 German Pattern..... gro. \$4.00 @ 4.75

Hollow Augers—

Bonney Pattern, per doz. \$10.00 @ 11.00
 Ames..... 25 @ 10%
 New Patent..... 25 @ 10%
 Universal..... 30%
 Wood's Universal..... 25%

Ship Augers and Bits—

Ford's..... 40%
 Snell's..... 40%
 C. E. Jennings & Co.:
 L'Hommiedieu's..... 15 1/2 @ 10%
 Watrous..... 33 1/2 @ 10%

Awl Hafts, See Hafts, Awl.

Awls—

Brad Awls:
 Handled..... gro. \$1.75 @ 1.50
 Unhandled, Shouldered, gro. \$1.50 @ 1.25
 Unhandled, Patent..... gro. \$1.50 @ 1.25
 Peg Awls:
 Unhandled, Patent..... gro. \$1.50 @ 1.25
 Unhandled, Shouldered, gro. \$1.50 @ 1.25

Scratch Awls:

Handled, Common, gro. \$3.50 @ 4.00
 Handled, Socket, gro. \$11.50 @ 12.00
 Hurwood..... 40%

Awl and Tool Sets—See

Sets, Awl and Tool.

Axes—

First Quality..... \$5.50 @ 6.00
 Second Quality..... \$4.75 @ 5.25

Axle Grease—See Grease, Axle

Axles—

Concord, Loose Collar..... 5 @ 5 1/2 @ 5%
 Concord, Solid Collar..... 5 @ 5 1/2 @ 5%
 No. 1 Common..... 5 @ 5 1/2 @ 5%
 No. 1 1/2 Com. New Style..... 5 @ 5 1/2 @ 5%
 No. 2 Solid Collar..... 5 @ 5 1/2 @ 5%
 Nos. 7, 8, 11 and 12..... 60 1/2 @ 60 1/2 @ 10%
 Nos. 13 to 15..... 60 1/2 @ 60 1/2 @ 10%
 Nos. 15 to 19..... 60 1/2 @ 60 1/2 @ 10%
 Nos. 19 to 22..... 60 1/2 @ 60 1/2 @ 10%

Boxes, Axle—

Common and Concord, not turned..... 15 @ 10 1/2 @ 4 1/2 %
 Common and Concord, turned..... 15 @ 10 1/2 @ 4 1/2 %
 Half Patent..... 15 @ 10 1/2 @ 4 1/2 %

Bait—Fishing—

Head 7 1/2:
 A Bait..... 30%
 B Bait..... 35%
 Competitor Bait..... 30 1/2 %
 Balances—Sash—

Caldwell new list..... 50%
 Peilman's..... 60%

Spring Balances—

Chatillon's:
 Light Spg. Balances..... 40 @ 10 1/2
 Straight Balances..... 40%
 Circular Balances..... 50%
 Large Dial..... 30 1/2 %
 Pelouze..... 50%
 Barb Wire—See Wire, Barb.

Bars—Crow—

Steel Crowbars, 10 to 40 lb., per lb. 3 @ 3 1/2 %

Towel—

No. 10 Ideal, Nickel Plate..... \$ gro. \$9.50

Beams, Scale—

Scale Beams, List Jan. 12, '92, 40 @ 10%
 Chatillon's No. 1..... 40%
 Chatillon's No. 2..... 40%

Beaters—Carpet—

Holt-Lyon Co.:
 No. 12 Wire Coppered \$ doz. \$0.85;
 Tinned..... \$1.00
 No. 11 Wire Coppered \$ doz. \$1.10;
 Tinned..... \$1.20
 No. 10 Wire Galvanized..... \$ doz. \$1.75
 Western W. G. Co.:
 No. 1 Electric..... \$ gro. \$7.80
 No. 2 Buffalo..... \$ gro. \$9.00
 No. 3 Perfection Dust..... \$ gro. \$8.00

Egg—

Holt-Lyon Co.:
 Holt, No. A, Japanese..... \$ doz. \$1.20
 Holt, No. 1, Tinned..... \$ doz. \$1.50
 Holt, No. B, Japanese..... \$ doz. \$2.00
 Holt, No. 2, Tinned..... \$ doz. \$2.25
 Lyon, No. 2, Japanese..... \$ doz. \$1.25
 Lyon, No. 3, Japanese..... \$ doz. \$1.50
 Lightning Chain, W. gro. \$15.00
 National Mfg. Co.:
 No. 1 Dover, Family size..... \$7.00
 No. 2 Dover, Hotel size..... \$14.00
 Taplin Mfg. Co.:
 No. 68 Improved Dover..... \$6.00
 No. 75 Improved Dover..... \$6.50
 No. 100 Improved Dover..... \$7.00
 No. 102 Improved Dover, Tin'd..... \$8.50
 No. 150 Improved Dover, Hotel..... \$15.00
 No. 152 Imp'd Dover, Hotel, Tin'd..... \$17.00
 No. 200 Imp'd Dover Tumbler..... \$8.50
 No. 202 Imp'd Dover Tumbler, Tin'd..... \$9.50
 No. 300, Imp'd Dover Mammoth..... \$20.00
 Western W. G. Co., Buffalo..... \$7.00
 Wonder (S. S. & Co.)..... \$ gro. net, \$6.00

Bellows—

Blacksmith, Standard List, 75 @ 75 1/2 @ 5%
 Blacksmiths':
 Inch..... 30 3 1/2 3 1/2 3 1/2 3 1/2 3 1/2
 Each, \$3.50 3.75 4.25 4.50 5.00 5.25 5.50
 Extra Length:
 Each, \$4.00 4.50 5.10 5.50 6.00 6.50 7.50

Molders—

Inch..... 10 12 15
 Doz..... \$5.50 10.00 15.00

Hand—

Inch..... 6 7 8 9 10
 Doz..... \$4.25 4.50 5.00 5.50 7.75

Bells—Cow—

Ordinary goods..... 75 @ 75 1/2 @ 10%
 High grade..... 70 @ 70 1/2 @ 10%
 Jersey..... 75 @ 10%
 Texas Star..... 50%

Door—

Abbe's Gong..... 45%
 Barton Gong..... 50%
 Bone, B. & Mfg. Co.'s..... 55 @ 10%
 Lever and Pull, Sergeant..... 60 @ 10 1/2 @ 10%
 Yankee Gong..... 35%

Hand—

Hand Bells, Polished, Brass..... 60 @ 60 1/2 @ 10%

White Metal..... 60%

Nickel Plated..... 30 @ 50 1/2 @ 5%
 Series..... 60 @ 60 1/2 @ 7 1/2 %
 Cone's Globe Hand Bells..... 33 1/2 @ 33 1/2 @ 10%
 Silver Chime..... 33 1/2 @ 33 1/2 @ 10%

Miscellaneous—

Farm Bells..... lb. 2 @ 2 1/2 %
 Steel Alloy Church and School..... 60 @ 60 1/2 @ 5%
 American Tube & Stamp'g Co. Gong..... 75%
 Table Call Bells..... 50 @ 50 1/2 @ 1 1/2 %
 Trip Gong Bells..... 55 @ 10 @ 60%

Belting—Rubber—

Agricultural (Low Grade)..... 75 @ 75 1/2 @ 5%
 Common Standard..... 70 @ 70 1/2 @ 10%
 Standard..... 65 @ 70%
 Extra..... 60 @ 60 1/2 @ 10%
 High Grade..... 50 @ 50 1/2 @ 10%
 Boston Belting Co.:
 Seamless Stitched Imperial..... 45 1/2 %
 Boston..... 50 1/2 %
 Niagara..... 60 1/2 %

Leather—

Extra Heavy, Short Lap..... 60 @ 60 1/2 @ 5%
 Regular Short Lap..... 60 @ 60 1/2 @ 10%
 Standard..... 70 @ 70 1/2 @ 5%
 Light Standard..... 70 @ 70 1/2 @ 10%
 Cut Leather Lacing..... 60 @ 10%
 Leather Lacing Sides, per sq. ft. 15c

Bench Stops—See Stops, Bench

Benders and Upsetters,

Tire—

Detroit Perfected Tire Bender..... 40%
 Green River Tire Benders and Upsetters..... 30%
 Detroit Stoddard's Lightning Tire Upsetters, No. 1, \$4.25; No. 2, \$7.25; No. 3, \$10.50; No. 4, \$16.50; No. 5, \$20.50.

Bicycle Goods—

John S. Long's Son's 1903 list:
 Chain..... 50%
 Parts..... 50%
 Spokes..... 50%
 Tubes..... 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—
 See Augers and Bits.

Blocks—Tackle—

Common Wooden..... 70 @ 70 1/2 @ 5%
 Hollow Steel Blocks, with Ford's Patent Sheaves..... 50 @ 10%
 Lane's Patent Automatic Lock and Junior..... 30%
 Stowell's Novelty, Mal. Iron..... 50 @ 10%
 Stowell's Self Loading..... 60%
 See also *Machines, Hoisting*.

Boards, Stove—

Zinc, Crystal, &c..... 30 @ 10 @ 40 1/2 @ 5%

Boils—

Carriage, Machine, &c.—

Common Carriage..... 75 @ 10%
 Phila. Eagle, \$5.00 list May 25, '99..... 80 @ 80 1/2 @ 10%
 Bolt Ends, list Feb. 14, '96..... 75 @ 10%
 Machine with C. & T. Nuts..... 75 @ 75 1/2 @ 5%
 70 1/2 @ 5%
 70 1/2 @ 5%

Door and Shutter—

Cast Iron Barrel, Round Brass Knob:
 Inch..... 3 4 5 6 8
 Per doz..... \$0.26 30 39 47 65
 Cast Iron Spring Foot:
 Inch..... 6 8 10
 Per doz..... \$1.00 1.25 1.75
 Cast Iron Chain, Flat, Japanese:
 Inch..... 6 8 10
 Per doz..... \$0.75 1.05 1.30
 Cast Iron Shutter, Brass Knobs:
 Inch..... 6 8 10
 Per doz..... \$0.87 1.00 1.00
 Wrt Barrel, Jap'd, 75 @ 75 1/2 @ 10%
 Wrought Bronzed, 100 @ 50 @ 10%
 Wrought Flush, B. K., 50 @ 10 @ 50 1/2 @ 10%
 Wrought Shutter..... 100 @ 10 @ 100 @ 5%
 Wrought Square Neck..... 50 @ 50 1/2 @ 10%
 Wrought Sunk, Flush..... 50 @ 50 1/2 @ 10%
 Ives' Patent Door..... 60%

Stove and Plow—

Plow..... 65 @ 10 @ 5%
 Stove..... 30 @ 5 @ 30 @ 10 1/2 @ 5%

Tire—

Common..... 75 @ 75 1/2 @ 10%

Norway Iron..... 80 @ 80 1/2 @ 10%

American Screw Company:
 Norway Phila., list Oct. 19, '94..... 80%
 Eagle Phila., list Oct. 16, '94..... 82 1/2 %
 Bay State, list Dec. 28, '99..... 72 1/2 %
 Franklin Moore Co.:
 Norway Phila., list Oct. 16, '94..... 80%
 Eagle Phila., list Oct. 16, '94..... 82 1/2 %
 Ellipse, list Dec. 28, '99..... 73 1/2 %
 Russell, Burdall & Ward Bolt & Nut Co.:
 Empire, list Dec. 28, '99..... 79 1/2 %
 Norway Phila., list Oct. '94..... 80%
 Onson Nut Co.:
 Tire Bolts..... 72 1/2 %

Borers, Tap—

Borers Tap, Ring, with Handle:
 Inch..... 1 1/4 1 1/2 1 3/4
 Per doz..... \$1.50 5.00 5.75 7.25
 Inch..... 2 1/4 2 1/2
 Per Doz..... \$3.65 11.50
 Enterprise Mfg. Co., No. 1, \$1.25; No. 2, \$1.65; No. 3, \$2.50 each..... 25%

Boxes, Mitre—

C. E. Jennings & Co..... 25 @ 10%
 Langdon..... 15 @ 10%
 Perfection..... \$ doz. \$3.00
 Schatz..... 40%

Braces—

NOTE.—Most Braces are sold at net prices.
 Common Ball, American..... \$1.15 @ 1.25
 Barber's..... 50 @ 10 @ 60 @ 10%
 Fray's Genuine Spotted s..... 40%
 Fray's N. C. 70 to 120, 81 to 123, 207 to 414..... 60%
 C. E. Jennings & Co..... 50 @ 10%
 Mayhew's Ratchet..... 10%
 Marhew's Quick Action Hay Patent..... 50%
 Millers Falls Drill Braces..... 25 @ 10%
 P. S. & W. Co. Peck's Patent 60 @ 10 @ 65%

Brackets—

Wrought Steel..... 30 @ 10%
 Bradley's Wire Shelf:
 Full cases..... 80 @ 10 @ 10%
 Broken cases..... 80 @ 10%
 Griffin's Pressed Steel..... 30%
 Griffin's Folding Brackets..... 70 @ 10%
 Stowell's Cast Shelf..... 75%
 Stowell's Sink..... 50%
 Western W. G. Co., Wire..... 60 @ 10%

Bright Wire Goods—See

Wire and Wire Goods.

Broilers—

Western W. G. Co..... 80%
 Wire Goods Co..... 75 @ 75 1/2 @ 10%

Buckets, Well and Fire—

See Pails

Bucks, Saw—

Hooster..... \$ gro. \$36.00

Bull Rings—See Rings, Bull.

Butts—Brass—

Wrought list Sept., '96..... 20 @ 30%
 Cast Brass, Tiebout's..... 50%

Cast Iron—

Fast Joint, Broad..... 50 @ 50 1/2 @ 10%
 Fast Joint, Narrow..... 50 @ 50 1/2 @ 10%
 Loose Joint..... 70 @ 50 @ 70 1/2 @ 10%
 Loose Pin..... 70 @ 50 @ 70 1/2 @ 10%
 Mayer's Hinges..... 70 @ 50 @ 70 1/2 @ 10%
 Parliament Butts..... 70 @ 50 @ 70 1/2 @ 10%

Wrought Steel—

Table and Back Flaps..... 75%
 Narrow and Broad..... 75%
 Inside Blind..... 75 @ 10%
 Loose Pin..... 75%
 Loose Pin, Ball and Steeple Tip..... 80 @ 20%
 Japanned, Ball Tip Butts, 70 @ 10%
 Bronzed Wrt. Nar. and Inside Blind Butts..... 65 @ 10%

Cages, Bird—

Hendryx, Brass:
 3000, 5000, 1100 series..... 51
 1300 series..... 33 1/2
 200, 300, 600 and 900 series..... 40 @ 10%
 Hendryx Bronze:
 700, 800 series..... 40 @ 10%
 Hendryx Enamelled..... 40 @ 10%

Callipers—See Compasses,

Calks, Too and Heel—

Blunt, 1 prong..... per lb. 4 @ 4 1/2 %
 Sharp, 1 prong..... per lb. 4 1/2 @ 4 1/2 %
 Perkins' Hunt Toe..... cents, \$ 1.25
 Perkins' Sharp Toe..... cents, \$ 1.45

Forks—

Base Discounts Aug. 1, 1892, list:

Hay, 2 tine.....	50¢ 10¢ 5¢
Boys' & Fish, 2 tine.....	50¢ 10¢ 5¢
Hay & Boys', 3 tine.....	60¢ 12¢ 5¢
Hay & Boys', 4 tine.....	60¢ 12¢ 5¢
Champion Hay.....	60¢ 12¢ 5¢
Hay & Header, long 3 tine.....	60¢ 12¢ 5¢
Header, 4 tine.....	60¢ 12¢ 5¢
Harley, 4 & 5 tine, Steel.....	60¢ 12¢ 5¢
Manure, 4 tine.....	60¢ 12¢ 5¢
Manure, 5 & 6 tine.....	60¢ 12¢ 5¢
Spading.....	70¢ 12¢ 5¢
Potato Digger, 6 tine.....	70¢ 12¢ 5¢
Sugar Beet.....	40¢ 10¢ 5¢
Coke & Coal.....	40¢ 10¢ 5¢
Havy Mill & Street.....	60¢ 12¢ 5¢
Iowa Dig-Ezy Potato.....	60¢ 12¢ 5¢
Victor, Hay.....	60¢ 12¢ 5¢
Victor, Manure.....	60¢ 12¢ 5¢
Victor, Header.....	60¢ 12¢ 5¢
Champion, Hay.....	60¢ 12¢ 5¢
Champion, Header.....	60¢ 12¢ 5¢
Columbia, Hay.....	60¢ 12¢ 5¢
Columbia, Manure.....	60¢ 12¢ 5¢
Columbia, Spading.....	70¢ 12¢ 5¢
Hawkeye Wood Barley.....	40¢ 10¢ 5¢
W. & C. Potato Digger.....	60¢ 12¢ 5¢
Acme Hay.....	60¢ 12¢ 5¢
Acme Manure.....	60¢ 12¢ 5¢
Dakota Header.....	60¢ 12¢ 5¢
Jackson Steel Barley.....	60¢ 12¢ 5¢
Kansas Header.....	60¢ 12¢ 5¢
W. & C. Favorite Wood Barley.....	40¢ 10¢ 5¢
Pated.—See Spoons.	

Fountains, Stock—

Double Dewey..... 1 doz. \$13.00

Frames—Saw—

White, Straight Bar, per doz. 75¢ 30¢

Red, Straight Bar, per doz. \$1.00 31¢

Red, Double Bar, per doz. \$1.40 1.50

Freezers Ice Cream—

Qt. 1 2 3 4 6

Each..... \$1.25 \$1.00 \$1.90 \$3.20 \$2.80

Fruit and Jelly Presses—

See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.**Fuse—**

Per 1000 Feet.

Hemp..... \$3.75

Cotton..... \$3.80

Waterproof Single Taped..... \$3.60

Waterproof Double Taped..... \$4.40

Waterproof Triple Taped..... \$5.15

Gates, Molasses and Oil—

Stebbins' Pattern..... 80¢ 10¢ 80¢ 10¢ 5¢

Gauges—

Marking, Mortise, etc..... 50¢ 10¢ 5¢ 50¢ 10¢ 5¢

Chapin-Stephens Co..... 50¢ 10¢ 5¢ 50¢ 10¢ 5¢

Marking, Mortise etc. 50¢ 10¢ 5¢ 50¢ 10¢ 5¢

Scholl's Patent..... 50¢ 10¢ 5¢ 50¢ 10¢ 5¢

Door Hangers..... 50¢ 10¢ 5¢ 50¢ 10¢ 5¢

Fulton's Butt Gauge..... 50¢ 10¢ 5¢ 50¢ 10¢ 5¢

Stanley & L. Co.'s Butt & Babbet Gauge..... 50¢ 10¢ 5¢ 50¢ 10¢ 5¢

Wire, Brown & Sharpe's..... 50¢ 10¢ 5¢ 50¢ 10¢ 5¢

Wire, Morse's..... 50¢ 10¢ 5¢ 50¢ 10¢ 5¢

Wire F. S. & W. Co..... 50¢ 10¢ 5¢ 50¢ 10¢ 5¢

Glimes—Single Cut—

Nail, Metal, Assorted, gro. \$1.40 1.50

Spike, Metal, Assorted, gro. \$2.80 3.00

Nail, Wood Handled, Assorted, gro. \$1.75 2.00

Spike, Wood Handled, Assorted, gro. \$1.25 1.50

Class, American Window

See Trade Report.

Glasses, Level—

Chapin-Stephens Co..... 50¢ 10¢ 5¢ 50¢ 10¢ 5¢

Glue—Liquid Fish—

Bottles or Cans, with Brush..... 25¢ 50¢

Cans (1/2 pts., pts., qts., 1/2 gal., gal.)..... 25¢ 50¢

International Glue Co. (Martin's)..... 40¢ 10¢ 5¢

Grease Axle—

Common Grade..... gro. \$1.50 1.50

Dixon's Everlasting, in lbs., 3 doz. 1 lb. \$1.30; 2 doz. \$2.00

Grips, Nipple—

Perfect Nipple Grips..... 40¢ 10¢ 5¢

Griddles, Soapstone—

Pike Mfg. Co..... 33¢ 33¢ 10¢

Grindstones—

Bicycle Emery Grinder..... \$6.50

Bicycle Grindstones, each..... \$2.50 3.00

Pike Mfg. Co.

Improved Family Grindstones..... 20¢ 20¢

Pike Mower Knife and Tool..... 40¢ 40¢

Grinder, each..... \$5.00

Velox Ball Bearing, mounted, Angle Iron Frame..... each, \$4.25

Halters and Ties—

Web..... 45¢ 25¢

Jute Rope..... 40¢ 45¢

Sisal Rope..... 30¢ 35¢

Cover's Saddlery Works:

Web and Leather Halters..... 70¢

Jute and Manila Rope Halters..... 70¢

Sisal Rope Halters..... 70¢

Jute, Manila and Cotton Rope Ties..... 70¢

Sisal Rope Ties..... 70¢

Hammers—

Handled Hammers—

Sargent's C. S. New List..... 40%**Heavy Hammers and Sledges—**

Under 3 lb..... 50¢

3 to 5 lb..... 75¢ 10¢ 5¢

Over 5 lb..... 10¢ 5¢

Wilkinson's Smiths'..... 9¢ 10¢ 10¢

Handles—**Agricultural Tool Handles—**

Axe, Pick, etc..... 40¢ 50¢ 5¢

Hoe, Rake, etc..... 45¢ 50¢ 5¢

Fork, Shovel, Spade, etc..... 45¢ 50¢ 5¢

Long Handles..... 45¢ 50¢ 5¢

D Handles..... 40%

Cross-Cut Saw Handles—

Atkins'..... 40¢ 45¢ 10¢

Champion..... 45¢ 45¢ 10¢

Daston's..... 50%

Mechanics' Tool Handle..... 75

Auger, assorted..... gro. \$2.50 2.85

Bradawl..... gro. \$1.65 1.85

Chisel Handles:

Apple Tanged Firmer, gro. ass'd..... \$2.40 2.55

Hickory Tanged Firmer, gro. ass'd..... \$2.15 2.40

Apple Socket Firmer, gro. ass'd..... \$1.75 1.95

Hickory Socket Firmer, gro. ass'd..... \$1.15 1.30

Hickory Socket Framing, gro. ass'd..... \$1.60 1.75

File, assorted..... gro. \$1.30 1.40

Hammer, Hatchet, Axe, etc..... 50%

Hand Saw, Varnished, doz. 80¢ 85¢

Not Varnished..... 65¢ 75¢

Plane Handles:

Jack doz. 30¢; Jack Bolted..... 75¢

Fore, doz..... 45¢; Fore, Bolted..... 90¢

Chapin-Stephens Co.:

Carving Tool..... 40¢ 40¢ 10¢

Chisel..... 55¢ 65¢ 10¢

File and Awl..... 55¢ 65¢ 10¢

Saw and Plane..... 40¢ 40¢ 10¢

Screw Driver..... 40¢ 40¢ 10¢

Millers Falls Adj. and Hatchet Auger..... 1.50 1.60

Nicholson Simplicity File Handle..... \$1.50 1.60

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, etc.

Barn Door, New Pattern, Round Groove, Regular:

Inch..... 3 4 5 6 8

Single Doz. \$0.90 1.25 1.60 1.95 2.50

Barn Door, New England Pattern, Check Back, Regular:

Inch..... 3 4 5 6 8

Single Doz. \$1.30 1.85 2.50 3.00

Allith Mfg. Co.

Reliable No. 1..... per doz. \$12.00

Reliable No. 2..... per doz. \$15.00

Chicago Spring Butt Co.:

Friction..... 25%

Oscillating..... 25%

Big Twin..... 25%

Chisholm & Moore Mfg. Co.:

Baggage Car Door..... 50%

Elevator..... 30%

Railroad..... 50%

Cronk & Carrier Mfg. Co.:

Locks Axle..... 60%

Roller Bearing..... 60¢ 10¢ 5¢

Lane Bros. Co.:

Parlor Ball Bearing..... \$4.15

Parlor Standard..... \$3.35

Parlor New Model..... \$3.25

Parlor New Champion..... \$3.25

Barn Door, Standard, 50¢ 10¢ 10¢ 5¢

Hinged..... \$6.40

Covered..... 50¢ 10¢ 10¢ 5¢

Special..... 50¢ 10¢ 10¢ 5¢

Lawrence Bros.:

Advance..... 90%

Cleveland..... 90¢ 10¢ 5¢

Crown..... 60%

Giant..... 50¢ 10¢ 5¢

New York..... 80%

Peerless..... 60¢ 10¢ 5¢

Sterling..... 60%

Spring..... 90%

Union, No. 44, \$5.00; No. 45 \$7.00;

No. 46, \$9.00.

McKinney Mfg. Co.:

No. 1, Special, \$15..... 60¢ 10¢ 5¢

No. 2, Standard, \$18..... 60¢ 10¢ 5¢

Hinged Hangers, \$14..... 50%

Meyers' Stays Hangers..... 60%

C. S. Smith Mfg. Co.:

Lundy Parlor Door..... 50¢ 10¢ 5¢

Monarch Barn Door..... 60¢ 10¢ 5¢

Never Jump Hinge..... 50¢ 10¢ 5¢

Peerless..... 60%

Baggage Car Door..... 50%**Climate Anti-Friction..... 50¢ 10¢ 5¢****Elevator..... 40%****Express..... 50%****Freight Car Door..... 40¢ 10¢ 5¢****Interstate..... 40¢ 10¢ 5¢****Lundy Parlor Door..... 50¢ 10¢ 5¢****Matchless..... 60%****Nansen..... 60¢ 10¢ 5¢****Parlor Door..... 50¢ 10¢ 5¢****Railroad..... 50¢ 10¢ 5¢****Rex Hinge Door..... 50%****Street Car Door..... 50%****Steel, Nos. 300, 404, 500..... 50¢ 10¢ 5¢****Underwriter's Fire Door..... 40%****Wild West Warehouse Door..... 50%****Zenith for Wood Track..... 50¢ 10¢ 5¢****A. L. Sweet Iron Works:**

Eagle..... 40¢ 10¢ 5¢

Hylo..... 50¢ 10¢ 5¢

Perfection..... 60%

Pilot..... 40%

Taylor & Boggs' Fly Co.'s Kidder's Roller Bearing..... 50¢ 10¢ 5¢

Wilcox Mfg. Co.:

Bike Roller Bearing..... 60¢ 10¢ 5¢

C. J. Roller Bearing..... 60¢ 10¢ 5¢

Cycle Ball Bearing..... 50%

Dwarf Ball Bearing..... 40%

Ives' Wood Track..... 60¢ 10¢ 5¢

L. T. Roller Bearing..... 50¢ 10¢ 5¢

New Era Roller Bearing..... 50¢ 10¢ 5¢

O. K. Roller Bearing..... 60¢ 10¢ 5¢

Prindle, Wood Track..... 60%

Richards' Wood Track..... 60%

Richards' Steel Track..... 50¢ 10¢ 5¢

Spencer Roller Bearing..... 60¢ 10¢ 5¢

Tandem Nos. 1 and 2..... 40%

Underwriters' Roller Bearing..... 40%

Velvet..... 50%

Wilcox Auditorium Ball Bearing..... 50%

Wilcox Barn Trolley No. 123..... 40%

Wilcox Elev. Door, Nos. 122 and 123..... 50%

Wilcox Elev. Door, No. 122..... 50%

Wilcox Fire Trolley, Roller Bearing..... 40%

Wilcox Le Roy Noiseless Ball Bearing..... 40%

Wilcox New Century..... 50¢ 10¢ 5¢

Wilcox O. K. Steel Track..... 50%

Wilcox O. K. Trolley..... 50%

Wilcox Trolley Ball Bearing..... 40%

Wilcox Wideman Narrow Gauge, Ball Bearing..... 40%

For Track, see Rail

Hangers, Garment—

Western, W. G. Co..... 70¢ 10¢ 5¢

Gate

Myers' Patent Gate Hangers, per doz. net 4.50

Hasps—

McKinney's Perfect Hasp, per doz..... 50%

Hatchets—

Regular list..... 40¢ 40¢ 5¢

Heaters, Carriage—

Clark, No. 3, \$2.25; No. 3D, \$2.15; No. 3E, \$2.15; No. 3F, \$2.15; No. 3G, \$2.15; No. 3H, \$2.15; No. 3I, \$2.15; No. 3J, \$2.15; No. 3K, \$2.15; No. 3L, \$2.15; No. 3M, \$2.15; No. 3N, \$2.15; No. 3O, \$2.15; No. 3P, \$2.15; No. 3Q, \$2.15; No. 3R, \$2.15; No. 3S, \$2.15; No. 3T, \$2.15; No. 3U, \$2.15; No. 3V, \$2.15; No. 3W, \$2.15; No. 3X, \$2.15; No. 3Y, \$2.15; No. 3Z, \$2.15; No. 3AA, \$2.15; No. 3AB, \$2.15; No. 3AC, \$2.15; No. 3AD, \$2.15; No. 3AE, \$2.15; No. 3AF, \$2.15; No. 3AG, \$2.15; No. 3AH, \$2.15; No. 3AI, \$2.15; No. 3AJ, \$2.15; No. 3AK, \$2.15; No. 3AL, \$2.15; No. 3AM, \$2.15; No. 3AN, \$2.15; No. 3AO, \$2.15; No. 3AP, \$2.15; No. 3AQ, \$2.15; No. 3AR, \$2.15; No. 3AS, \$2.15; No. 3AT, \$2.15; No. 3AU, \$2.15; No. 3AV, \$2.15; No. 3AW, \$2.15; No. 3AX, \$2.15; No. 3AY, \$2.15; No. 3AZ, \$2.15; No. 3BA, \$2.15; No. 3BB, \$2.15; No. 3BC, \$2.15; No. 3BD, \$2.15; No. 3BE, \$2.15; No. 3BF, \$2.15; No. 3BG, \$2.15; No. 3BH, \$2.15; No. 3BI, \$2.15; No. 3BJ, \$2.15; No. 3BK, \$2.15; No. 3BL, \$2.15; No. 3BM, \$2.15; No. 3BN, \$2.15; No. 3BO, \$2.15; No. 3BP, \$2.15; No. 3BQ, \$2.15; No. 3BR, \$2.15; No. 3BS, \$2.15; No. 3BT, \$2.15; No. 3BU, \$2.15; No. 3BV, \$2.15; No. 3BW, \$2.15; No. 3BX, \$2.15; No. 3BY, \$2.15; No. 3BZ, \$2.15; No. 3CA, \$2.15; No. 3CB, \$2.15; No. 3CC, \$2.15; No. 3CD, \$2.15; No. 3CE, \$2.15; No. 3CF, \$2.15; No. 3CG, \$2.15; No. 3CH, \$2.15; No. 3CI, \$2.15; No. 3CJ, \$2.15; No. 3CK, \$2.15; No. 3CL, \$2.15; No. 3CM, \$2.15; No. 3CN, \$2.15

Wire Goods Co:

Acme.....	60¢10%
Chief.....	70¢
Crown.....	70¢10%
Cat.....	65¢
V Brace.....	70¢10%
Cash Harness.....	50¢10%

Wrought Iron—

Box, 6 in., per doz. \$1.00; 8 in., \$1.25; 10 in., \$2.50.	
Cotton.....	doz. \$1.05@1.25
Wrought Staples, Hooks, &c.—	

Miscellaneous—

Hooks, Bench, See Staps. Bench.	
Bush, Light, doz. \$5.50; Medium, \$6.00; Heavy, \$6.50	
Grass.....	No. 1 2 3 4

Best.....	\$1.50 1.75 2.00
Common.....	\$1.30 1.50 1.60 1.60
Potato and Manure.....	60¢15%

Whistle, tree.....	lb. 5¢4¢10%
Hooks and Eyes:	
Brass.....	60¢10¢10¢70%

Malleable Iron.....	70¢5¢70¢10%
Covert Saddlery Works' Self Locking Gate and Door Hook.....	60¢
Ft. Madison Cut-Easy Corn Hooks.....	doz. \$5.25 net

Bench Hooks—See Bench Hooks.	
Corn Knives—See Knives, Corn.	
Horse Nails—See Nails, Horse	

Horsehoes—	
See Shoes, Horse.	
Hose Rubber—	

Garden Hose, 1/2-inch:	
Competition.....	ft. 1/4¢ 5 c
3-ply Standard.....	ft. 6/4¢ 7 c

4-ply Standard.....	ft. 7/4¢ 8 c
2-ply extra.....	ft. 8/4¢ 9 c
4-ply extra.....	ft. 10/4¢ 10 c

Cotton Garden, 3/4-in., coupled:	
Low Grade.....	ft. 6 c 7 c
Fair quality.....	ft. 8 c 9 c

Irons—Sad—	
From 4 to 10.....	lb. 3/4¢ 3 c
B. B. Sad Irons.....	lb. 3/4¢ 3 c

Chinese Laundry.....	lb. 1/4¢ 5 c
Chinese Sad.....	lb. 1/4¢ 5 c
Mrs. Potts', per set:	

No.....	55 60 65
Jap'd Tops.....	71 63 81 78
Wind Tops.....	71 71 84 81

New England Pressing, lb.....	3/4¢4¢
Pinking Irons.....	doz. 50¢10¢
Soldering.....	doz. 50¢10¢

Soldering Coppers 3/4 and 5/8.....	19¢20¢
1 1/2 and 2.....	21¢22¢
Jack's Wagon—	

Covert Mfg. Co.....	20¢45¢
Auto Screw.....	21¢45¢
Steel.....	45¢25¢

Covert's Saddlery Works':	
Daisy.....	60¢10%
Victor.....	60¢10%

Lockport.....	50%
1 and 1/2 Steel.....	30¢10%
Kettles—	

Brass, Spun, Plain.....	20¢25%
Enamelled and Cast Iron—See Ware, Hollow.	
Knives—	

Butcher, Kitchen, &c.—	
Poster Bros', Butcher, &c.....	30%
Smith & Hemenway Co.....	40¢10%

Wilkinson Shear & Cutlery Co.....	50%
Hay and Straw—See Hay Knives.	
Corn—	

Withington Acme, 7 doz., \$2.05; Dent, \$2.75; Adj. Serrated, \$2.20; Serrated, \$3.10; Yankee No. 1, \$1.50; Yankee No. 2, \$1.15.	
Drawing—	

Standard List.....	70¢5¢70¢10%
Bradley's.....	35%
C. E. Jennings & Co. Nos. 45, 46, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.	

Buffalo.....	per gro. \$13.00
Miscellaneous—	
Farriers'.....	doz. \$3.00@3.25

Wostenholm's.....	per doz. \$3.00@3.25
Knobs—	

Base, 2 1/2-inch, Birch, or Maple,	
Rubber tip, gro.....	\$1.10@1.15
Carriage, Jap. all sizes.....	gro. 10¢45¢

Door, Mineral.....	doz. 65¢70¢
Door, Por. Jap'd.....	doz. 70¢75¢
Door, For. Nickel.....	doz. \$2.05@2.15

Bardley's Wood Door, Shutter, &c.....	15%
Picture, Sargent's.....	60¢10¢10%
Lacing Leather—	

See Belting Leather—	
Ladders, Step Etc.—	
Lane's Store.....	35%

Myers Noiseless Store Ladders.....	50%
Ladies' Melting—	
L. & G. Mfg. Co., Low List.....	25%

P. & W.....	50%
Reading.....	50%
Sargent's.....	50%

Lanterns—Tubular—	
Regular Tubular No. 0, doz. \$4.35@4.75	
Left Tubular, No. 0, doz. \$4.75@5.25	

Hinge Tubular, No. 0, doz. \$4.75@5.25	
Other Styles.....	40¢10¢40¢10%
Bull's Eye Police—	

No. 1, 3/4 inch.....	\$2.50@2.75
No. 2, 3 inch.....	\$2.75@3.00
Lasts and Stands Shoe—	

Stowell's Atlas, Malleable Iron.....	50%
Stowell's Badger, Cast Iron.....	50%
Latches—	

Thumb—	
Roggin's Latches, with screw, doz. \$3.00@3.50	
Leaders Cattle—	
Small.....	doz. 55¢; large, 60¢

Lifters, Transom—

R & E.....	33¢45¢
Lines—	
Wire Clothes, Nos. 15 19 20	

100 feet.....	\$2.20 2.00 1.65
75 feet.....	\$1.80 1.70 1.30
Samson Cordage Works:	

Solid Braided Chalk, No. 0 to 3.....	40%
Silver Lake Braided Chalk, No. 0, \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50.	
per gr.....	20%

Masons' Lines, Shade Cord, &c.: White Cotton, No. 3 1/2, \$1.50; No. 4, \$2.00; No. 4 1/2, \$2.50; Colors, No. 3 1/2, \$1.75; No. 4, \$2.25; No. 4 1/2, \$2.75; Lines, No. 3 1/2, \$2.50; No. 4, \$3.00; No. 4 1/2, \$3.50.	
Tent and Awning Lines: No. 4, \$5.00; Cotton, \$7.50; Drab Cotton, \$8.50.	

30 ft., \$3.25; 70 ft., \$3.75; 75 ft., \$4.00;
80 ft., \$4.25; 90 ft., \$4.75; 100 ft., \$5.25. 20%
Anniston Waterproof Clothes, 50 ft., \$
gro., \$36.00; Gilt Edge, \$24.00; Air Line
\$24.00; Acme, \$18.00; Alabama, \$17.00;

Stanley's Duplex..... 20@20.10&10%
Woods' Extension..... 39.45

Poachers, Egg—
Buffalo Steam Egg Poachers, # doz.
No. 1, \$6.00; No. 2, \$4.00; No. 3,
\$3.00; No. 4, \$12.00..... 50.4

Points, Glaziers'—
Junk and 1 lb. papers..... lb. 64c
1/2 lb. papers..... lb. 64c
1/4 lb. papers..... lb. 64c

Pokes, Animal—
Pt. Madison Hawkery..... # doz. \$3.25
Pt. Madison Western..... # doz. \$3.00

Police Goods—
Manufacturers' Lists..... 25@25.55
Towers..... 35%

Polish—Metal—
Prestoline Liquid, No. 1 (1/4 pt.), # doz.
\$3.00; No. 2 (1 qt.), \$9.75..... 40%

Prestoline Paste..... lb. 1/2c
George William Hoffman..... 10&10%
U. S. Metal Polish Paste, 3 oz. boxes,
doz. 50c; # gr. \$4.50; 1/2 lb. boxes,
doz. \$1.25; 1 lb. boxes, # doz. \$2.25.
U. S. Liquid, 8 oz. cans, # doz. \$1.25;
gr. \$12.00.
Barkeepers' Friend Metal Polish, # doz.
\$1.75; # gr. \$18.00.
Wynn's White Silk, 1/2 pt. cans, # doz.
..... \$2.00

Stove—
Black Eagle Benzine Paste, 5 lb. cans..... # 10#
Black Eagle, Liquid, 1/4 pt. cans # doz. 75c
Black Jack Paste, 1/4 lb. cans, # doz. \$1.00
Black Kid Paste, 1/4 lb. cans, each, \$0.65
Ladd's Black Beauty, # doz. \$1.00..... 50%
Joseph Dixon's, # gr. \$5.75..... 10%
Dixon's Plumbago..... # 8#
Fireside..... # gr. \$2.50
Gem, # gr. \$4.50..... 10%
Japanese..... # gr. \$3.50
Jet Black..... # gr. \$3.50
Peerless Iron Enamel, 10 oz. cans..... # doz. \$1.50

Wynn's:
Black Silk, 5 lb. pail..... each 70#
Black Silk, 1/2 lb. box..... # doz. \$1.00
Black Silk, 5 oz. box..... # doz. \$0.75
Black Silk, 1/4 pt. liq..... # doz. \$1.00

Poppers, Corn—
1 qt., Square..... # doz. \$9.00
1 qt., Round..... # doz. \$10.00
1/2 qt., Square..... # doz. 11.00
2 qt., Square..... # doz. 13.00

Post Hole and Tree Augers and Diggers—
See also Diggers, Post Holes, etc.

Posts, Steel—
Steel Fence Posts, 4 in. x 4 in., 42 ft.; 6
ft., 46 ft.; 6 ft., 48 ft.
Steel Hitching Post, each..... \$1.30

Potato Papers—
See Papers, Potato.

Pots—Glue—
Enamelled..... 40%
Tinned..... 35%

Powder—
In Canisters:
Duck, 1 lb. each..... 45c
Fine Sporting, 1 lb. each..... 75c
Rifle, 1/2 lb. each..... 15c
Rifle, 1 lb. each..... 25c

King's Semi-Smokeless:
Keg (25 lb. bulk)..... \$0.50
Half Keg (12 1/2 lb. bulk)..... \$3.50
Quarter Keg (6 1/4 lb. bulk)..... \$1.90
Case 24 (1 lb. cans bulk)..... \$3.50
Half case (1 lb. cans bulk)..... \$4.50
King's Smokeless Shot Gun Rifle
Keg (25 lb. bulk)..... \$12.00 \$15.00
Half Keg (12 1/2 lb. bulk)..... 6.25 7.75
Quarter Keg (6 1/4 lb. bulk)..... 3.25 4.00
Case 24 (1 lb. cans bulk)..... 14.00 17.00
Half case 12 (1 lb. cans bulk) 7.25 8.75
Robin Hood Smokeless Shot Gun..... 50&20%

Presses—
Fruit and Jelly—
Enterprise Mfg. Co..... 20@25%
Sensible..... 35%
2 qt., \$2.00; 4 qt., \$4.00; 10 qt., \$6.00 each.

Seal Presses—
Morrell's No. 1, per doz. \$20.00..... 50%

Pruning Hooks and Shears—See Shears.

Pullers, Nail—

Cyclone..... 50%
Dudley Improved Nail Puller..... 30%
Miller's Falls, No. 3, per doz. \$12.00..... 35&10%

Pearson No. 1, Cyclone Spike Puller,
each \$30.00..... 50%
Pelican, # doz. \$9.00..... 40&10%
Seranton, Case Lots:
No. 2 B (large)..... \$5.50
No. 3 B (small)..... \$3.00
Smith & Hemenway Co.:
A. J. A..... 60%
Diamond B. No. 2, case lots, # doz. \$6.00
Diamond B. No. 3, case lots, # doz. \$5.50
Eureka..... 30%
Giant, No. 1, # doz. \$18; No. 2, \$15.50;
No. 3, \$13..... 40%
Yankoe..... 60%

Pulleys—Single Wheel—

Inch..... 2 2 1/2 3
Aurwing, # doz. \$0.55 \$5 1.15
Hay Fork, Swivel or Solid Eye,
doz., 1 in., \$1.15; 5 in., \$1.40

Inch..... 2 2 1/2 3
Hot House, # doz. \$0.70 \$0 1.35

Inch..... 1 1/4 1 1/2 1 3/4 2
Screw, # doz. \$0.16 \$1.19 \$3 30

Inch..... 1 1/4 1 1/2 1 3/4 2
Side, # doz. \$0.30 \$0 50 63 64

Inch..... 1 1/4 1 1/2 1 3/4 2 2 1/2
Tackle, # doz. \$0.30 \$2 53 1.00

Stowell's:
Ceiling or End, Anti-Friction..... 60&10%
Dumb Waiter, Anti-Friction..... 60&10%
Electric Light..... 60%
Side, Anti-Friction..... 60&10%

Sash Pulleys—
Common Frame: Square or Round
End, per doz., 1 1/4 and 2 in., 16@19c
Auger Mortise, no Face Plate, per
doz. 1 1/4 and 2 in., 16@19c
Auger Mortise, with Face Plate, per
doz., 1 1/4 and 2 in., 16@19c

Acme..... 1 1/4 in., 16; 2 in., 19
Common Sense, 1 1/4 in., # doz. 18; 2
in., 20c
Fox-All-Steel, Nos. 3 and 7, 2 in., # doz. 50%
Grand Rapids All-Steel Noiseless..... 50%
Ideal..... 70&35%
Niagara..... 1 1/4 in., 16; 2 in., 19c
No. 20, Troy..... 1 1/4 in., 14 1/2; 2 in., 10 1/2
Star..... 1 1/4 in., 16; 2 in., 19c
Tackle Blocks—See Blocks.

Pumps—
Cistern..... 60@60 10%
Pitcher Spout..... 30@30 10%
Wood..... 50@50 10%

Pump Leathers—
Plunger and Lower Valve—Per gro.:
Inch..... 2 2 1/2 2 3/4 2 5/8 2 7/8
\$2.20 2.50 2.75 3.00
Inch..... 3 3 1/2 3 3/4 3 1/2 4 1/2
\$3.30 3.60 3.85 4.10 4.40

Plunger Cup Leathers—Per 100:
Inch..... 2 1/2 3 3 1/2 4
\$2.75 3.85 5.00 6.00

Barnes Dbl. Acting (low list)..... 50&10%
Contractors' Rubber Diaphragm No. 2
B. & L. Black Co..... \$1.00
Daisy Spray Pump..... # doz. \$7.20

Flint & Walling's Fast Mail (low list) 55%
Flint & Walling's Pitcher Spout..... 30%
National Specialty Mfg. Co., Measur-
ing..... 40%
Mechanical Sprayer..... \$7.30
Myer's Pumps, low list..... 50%
Myer's Power Pumps..... 50%
Myer's Spray Pumps..... 50%

Punches—
Saddlers' or Drive, good..... # doz. 65@70c
Spring, single tube, good quality..... \$1.75@3.00

Revolving (tubes)..... # doz. \$3.50@3.75
Bemis & Call Co.'s Cast Steel Drive..... 50%
Bemis & Call Co.'s Check..... 55%
Benard Spring Belt Punches..... 39&5%
Lodi Spring Belt Punches..... 40%
Morrell's No. 1 (A. B. C.), # doz., \$15.00..... 20%
No. 2, # doz. \$23.30..... 30%
Hercules, each \$7.50..... 30%
Niagara Hollow Punches..... 40%
Niagara Solid Punches..... 55&10%
Paragon Spring Belt Punches..... 30%
Steel Screw, B. & K. Mfg. Co..... 40%
Timmer's Hollow, P. S. & W. Co., # doz. \$35&5%
Timmer's Solid, P. S. & W. Co., # doz. \$44..... 60%

Rail—Barn Door, &c.—
Cast Iron, Barn Door: Flange Screw
Holes for Rd. Groove Wheels:
1/4 3/8 1/2 3/4 1 in.
\$1.70 \$2.10 \$3.00 100 feet.

Angular for Sq. Groove Wheels:
Small, Med. Large.
1 1/2 1 3/4 1 1/2 1 3/4 100 feet.

Sliding Door, Iron Painted, \$4.25@4.4c
Sliding Door, Wrought Brass, 1 1/4
in., # doz. \$13.30..... 30%

Allith Mfg. Co., No. 1, Reliable Hanger
Track, # foot..... 8c
Allith Mfg. Co., No. 2, Reliable Hanger
Track, # foot..... 10c

Cronk's Double Braced Steel Rail, #
foot..... 3 1/2c
Cronk's No. 1, 1 1/2 in. Rail, # doz. \$34c
Lane's Hinged Track, # 100 ft., 1 in.,
\$3.70; 1 1/4 in., \$4.40

Lane's O. N. T., # 100 ft., 1 inch, \$3.00;
1 1/4 inch, \$3.70; 1 1/2 inch, \$4.00.
Lane's Standard, 1 1/4 in., # 100 ft. 4.00
Lawrence Bros., # ft. 1 1/4..... 3 1/2c
Lawrence Bros., New York..... 3 1/2c
McKinney's Hinged Hanger Rail, #
foot, 1 1/4..... 10c

McKinney's None Better..... # ft. 8 1/2c
McKinney's Standard..... # ft. 4 c
Myer's Stayon Track..... 50&10%
Safety Door Hanger Co.'s Storm King
Safety..... 60%

Safety Door Hanger Co.'s U. S. Standard
Safety..... 60%
Smith's Wrought Bracket, Plain..... 3 1/2c
Smith's Special..... 4 1/2c
Smith's Never Jump, per ft. 1 1/2..... 50%
Smith's Plain Steel..... 30%
Smith's Milled Steel..... 4 1/2c
Stowell's Cast Rail..... # ft. 1 1/2
Stowell's Steel Rail, Plain..... 2 1/2c
Stowell's Wrought Bracket, 1 1/2 in.,
ft. 3 1/2

Stowell's Wrought Bracket, 1 1/2 x 1 1/2,
ft. 7c
Sweet's Hylo, per ft. 1 1/2..... 50&10%
Sweet's P. L. B. Steel Rail, # 100 ft. \$3.00

Rakes—
Net Prices, Malleable Rakes:
10 12 14 16-tooth
Shank..... \$1.50 1.60 1.75 1.85
Socket..... \$1.65 1.80 1.95 2.10
Steel, Garden and Gravel, Aug. 1,
'99 List..... 70%
Weldless Steel..... 75&5%
Malleable Iron, Garden..... 70&10%
Lawn Rakes, Metal Head, per doz.
20 teeth..... \$3.25@3.50
24 teeth..... \$3.50@3.75
Fort Madison Red Head Lawn..... \$5.25
Fort Madison Blue Head Lawn..... \$4.70
Jackson Lawn, 20 and 30 teeth,
net, \$4.25

Kohler's:
Lawn Queen, 20-tooth, # doz..... \$3.45
Lawn Queen, 24-tooth, # doz..... \$3.60
Paragon, 20-tooth, # doz..... \$2.75
Paragon, 24-tooth, # doz..... \$3.00
Steel Garden, 14-tooth, # doz..... \$2.25
Malleable Garden, 14-tooth, # doz. \$2.00

Reaps, Horse—
Dixson..... 75%
Heller Bros..... 70&5@70&10&5%
McCaffrey's American Standard..... 70&10&5%
New Nicholson..... 70&10&5%
See also Files.

Razors—
Boards..... 60&10%
Fox Razors, No. 42, # doz. \$21.00..... 40%
Fox Razors, No. 44, # doz. \$20.00..... 40%
Fox Razors, No. 82, Platina, # doz.)
div..... 25.00

Red Devil..... 60%
Silberstein..... \$18.00
Carbo Magnetic..... \$15.00
Griffin, No. 65..... \$12.00
Griffin, No. 36..... \$12.00
All other Razors..... 40%

Safety Razors—
Safety Razors..... 40%
New Gem, in Tin Boxes..... # doz. \$12.10
New Gem, Extra Blades..... # doz. \$8.35
Gem Outfits (Razor, Strop, etc.)..... # doz. \$ 5.60

Complete Razor, extra Blade in Leather
Case..... # doz. \$17.00
Silberstein..... 40%

Reels—Fishing—
Bishop's Independent Fish Reel Spooler,
doz..... \$30.00
Hendryx:
M 6, Q 6, A 6, B 6, M 9 1/4, M 1 1/4, Q 1 1/4,
A 10, B 10, 4008, Rubber Populio,
Nickel Populio..... 20%
Aluminum, German Silver, Bronze..... 25%
1240 N, 124 N..... 20%
3004 N, 06 N, 0 R M, G D..... 25%
4 N, 6 PN, 24 N, 26 PN..... 20%
3004 P..... 33 1/2%
3004 PN..... 33 1/2%
0924 N..... 33 1/2%
0924 PN..... 33 1/2%
02084 N..... 33 1/2%
002094 PN..... 33 1/2%
802 N..... 33 1/2%
948 PN, 2904 N, 974 PN..... 25%
5009 P, 5009 N..... 20%
Competitor, 103 P, 103 PN, 203 P,
203 PN, 102 P, 102 PN..... 20%
804 P, 304 PN, 00304 P, 00304 PN..... 33 1/2%

Registers—List July 1, 1903.

Black Jap..... 75@75 1/2 10
White Jap..... 75@75 1/2 10
Bronzed..... 75@75 1/2 10
Nickel Plated..... 75@75 1/2 10
Electro Plated..... 75@75 1/2 10

Registers, Cash—
Sin. No. 10, Metal Cabinet..... \$30.00
Sin. No. 10, Wood Cabinet..... \$25.00

Revolvers—
Single Action..... 85@90c
Double Act' n, except 44 cal. \$1.90
Double Action, 44 caliber..... \$2.05
Automatic..... \$3.00
Hammerless..... \$4.10

Note.—Jobbers frequently cut the
above prices of manufacturers for
small trade.

Riddles, Hardware Grade
16 in., per doz..... \$2.25@2.50
17 in., per doz..... \$2.50@2.75
18 in., per doz..... \$2.75@3.00

Rings and Ringers—
Bull Rings:
Steel..... \$0.70 0.75 0.80 doz.
Copper..... 1.00 1.15 1.40 doz.

Hog Rings and Ringers—
Hill's Rings..... # doz. \$4.25@4.50
Hill's Ringers, Gray Iron, # doz. 50@55c
Hill's Ringers, Mal. Iron, # doz. 70@75c
Blair's Rings..... per gro. \$5.00@5.25
Blair's Ringers..... per doz. \$0.60@.65
Brown's Rings..... per gro. \$5.25@5.50
Brown's Ringers..... per doz. \$0.65@.70

Rivets and Burrs—
Copper..... 60@60 1/2 5%
Iron or Steel..... 75@75 1/2 10%

Rollers—
Acme Stowell's Anti-Friction..... 50%
Barn Door Sargent's list..... 60%
Cronk's Stay..... 60%
Cronk's Brinkerhoff..... 60%
Lane's Stay..... 33 1/2c
Stowell's Barn Door Stay..... # doz. \$1.00

Rope—
Manila, 7-16 in. diam. and
larger, tarred or un-
tarred..... lb. @ 12 c
Manila, Hay, Hide and
Bale Ropes, Medium and
Coarse..... lb. @ 12 c
Sisal, 7-16 in. diam. and
larger..... lb. @ 8 c
Mixed..... lb. @ 8 c
Pure..... lb. @ 9 1/2c
Sisal, Hay, Hide and Bale
Ropes, Medium and
Coarse..... lb. @ 8 c
Mixed..... lb. @ 8 c
Pure..... lb. @ 9 1/2c
Sisal, Tarred, Medium
and Yarn..... lb. @ 7 1/2c
Mixed..... lb. @ 7 1/2c
Pure..... lb. @ 8 1/2c
Cotton Rope..... lb. @ 13c
Best..... 1/4 in. and larger..... 13@16c
Medium..... 1/4 in. and larger..... 16@18c
Com..... 1/4 in. and larger..... 18@13c

Wire Rope—
Thread No. 1, 1/4 in. and up, lb. 6 c
Thread No. 2, 1/4 in. and up, lb. 5 1/2c
Old Colony Manila Transmission Rope,
17 1/2

Ropes, Hammocks—
Covert Mfg. Co.:
Jute..... 40&5%
Sisal..... 30%
Covert Saddlery Works..... 30%

Rules—
Boxwood..... 60&10 10%
Ivory..... 35&10@35&10 10%
Chapin-Stephens Co.:
Boxwood..... 60@60 10%
Ivory..... 35&10 10%
Miscellaneous..... 50@50 10&10%
Combination..... 55&55 10%
Larkin's Steel..... 60&10%
Larkin's Lumber..... 60&10%
Stanley R. & L. Co.:
Boxwood..... 60@60 10%
Ivory..... 35&10 10%

Upson Nut Co.:
Boxwood..... 60@60 10%
Ivory..... 35&10 10%
Sash Locks—See Locks, Sash

Sash Weights—
See Weights, Sash.

Sausage Stuffers or Fillers
—See Stuffers or Fillers, Sausage.

Saw Frames—See Frames, Saw.

Saw Sets—See Sets, Saw.

Saw Tools—See Tools, Saw.

Saws—

Atkins:
Circular..... 50%
Hand..... 50&10 10%
Cross Cut..... 35&5%
Mulay, Mill and Drag..... 50%
One-Man Saw..... 40%
Wood Saws..... 40%
Hand, Compass, &c..... 40%

Chapin-Stephens Co.:
Turning Saws and Frames..... 30@30 10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws..... 30&10 10%
Dixson's:
Circular, Solid and Inserted Tooth..... 50%
Band, 3 to 14 in. wide..... 6c
Hand, 1/2 to 2 1/2..... 70%
Crosscut..... 45%
Narrow Crosscut..... 50%
Mulay, Mill and Drag..... 50%
Framed Woodsaws..... 35%
Woodsaw Blades..... 35%
Woodsaw Rods..... 25%
Hand Saws, Nos. 12, 09, 9, 10, 1100,
DS, 120, 70, 77, 5..... 25%
Hand Saws, Nos. 7, 107, 107 1/2, 3, 1,
0, 00, Combination..... 30%
Compass, Keyhole, &c..... 25%
Butcher Saws and Blades..... 35%

C. E. Jennings & Co.'s:
Back Saws..... 25&10%
Butcher Saws..... 3&10%
Compass and Key Hole Saws..... 35&5 10%
Framed Wood Saws..... 30&10%
Hand Saws..... 30&5 10%
Wood Saw Blades..... 30&5 10%
Wood Saw Blades..... 30&5 10%

Millers Falls:
Butcher Saws..... 15&10%
Star Saw Blades..... 15&10%
Peace & Richardson's Hand Saws..... 30%
Simonds:
Circular Saws..... 50%
Crescent Ground Cross Cut Saws..... 35%
One-Man Cross Cut..... 40&10%
Gang Mill, Mulay and Drag Saws..... 50%
Band Saws..... 25&5 10%
Back Saws..... 25&5 10%
Butcher Saws..... 35&5 10%
Hand Saws..... 25&5 10%
Hand Saws, Bay State Brand..... 45%
Compass, Keyhole, &c..... 25&5 10%
Wood Saws..... 35&5 10%
Wheelers, Madden & Clemson Mfg. Co.'s
Cross Cut Saws..... 50%

Hack Saws—

Atkins' Hack Saw Blades A A A..... 25%
Dixson:
Concrete Blades..... 25%
Keystone..... 40%
Hack Saw Frames..... 40%
Fitchburg File Works, Tue Best..... 25%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180..... 35&5 10%
Hack Saws, Nos. 175, 180, complete..... 35&5 10%
Goodell's Hack Saw Blades..... 35&5 10%
Griffin's Hack Saw Frames..... 35&5 10%
Griffin's Hack Saw Blades..... 35&5 10%
Star Hack Saws and Blades..... 15&10%
Sterling Hack Saw Blades..... 75%
Sterling Hack Saw Frames..... 30& 10&5%

Scroll—

Barnes' No. 7, \$15..... 25%
Barnes' Scroll Saw Blades..... 40%
Barnes' Velocipede Power Scroll Saw,
without boring attachment, \$18;
with boring attachment, \$20..... 30%
Lester, complete, \$10.00..... 15&10%
Rogers, complete, \$4.00..... 15&10%

Scalers, Fish—
Bishop's Lightning..... # doz. \$9 10
Cover's Saddlery Works..... 60&10%

Scales—
Family, Turnbills..... 60@50 10%
Counter:
Hatch, Platform, 1/2 to 4 lbs. doz. \$5.50
Two Platforms, 1/2 oz to 8 lbs. doz. \$1.90
Union Platform, Plain..... \$1.70@1.90
Union Platform, Striped \$1.85@2.15
Chaillon's:
Eureka..... 25%
Favorite..... 25%
Grocers' Trip Scales..... 40%
Chicago Scale Co.:
The "Little Detective," 25 lbs..... 50%
Union or Family No. 2..... 60%
Portable Platform (reduced list)..... 50%
Wagon or Stock (reduced list)..... 25&35%
Pelouse Scales—Household, Counter,
Candy, Ice, Postal, Computing..... 50%
"The Standard" Portables..... 50%
"The Standard" R. R. and Wagon..... 50%

Scrapers—
Box, 1 Handle..... # doz. \$9.00@9.25
Box, 2 Handle..... # doz. \$2.60@2.85
Ship Light, \$2.00; Heavy, \$1.50
Adjustable Box Scraper (S. R. & L. Co.)
\$6.00..... 30&30 10%
Chapin-Stephens Co., Box..... 30&30 10%

Screens, Window, and

Frames—
Flyer Pattern Screens..... 60&5 10%
Maine Screen Frames..... 40&10 10%
Perfection Screens..... 60&5 10%
Phillips' Screen Frames..... 60&5 10%
Porter's:
Fairview Screens..... 60&5 10%
Hummer Screens..... 60&5 10%
Klondike Screens..... 60&5 10%
See also Doors.

Screws—Bench and Hand—

Bench, Iron, doz. 1 in. \$2.50@2.75;
1 1/2, \$3.00@3.25; 1 3/4, \$3.50@3.75
Bench, Wood, Beech, doz. 3/4@3.45
Hand, Wood, doz. 3/4@3.45
R. Hills Mfg. Co., Hand, doz. 3/4@3.45
Chapin-Stephens Co., Hand, doz. 3/4@3.45
Coach, Lag and Hand Rail—
Lag, Common Point, list Oct. 1,
99, 80¢@85¢
Coach and Lag, Gimlet Point, list
Oct. 1, '99, 80¢@85¢
Hand Rail, list Jan. 1, '81, 70¢@10¢@75¢

Jack Screws—

Standard List, 75¢@10¢@80¢@5¢
Millers Falls, 50¢@10¢@5¢
Millers Falls, Roller, 50¢@10¢
P. S. & W., 50¢@10¢@5¢
Sargent, 87¢@10¢@75¢

Machine—

List Jan. 1, '98,
Flat or Round Head, Iron, 50¢@5¢@10¢
Flat or Round Head, Brass, 50¢@5¢@10¢

Set and Cap—

Set (Iron or Steel), 75¢ } Extra
Sq. Hd. Cap, 10¢ } 10¢
Hex. Hd. Cap, 70¢ } often
Rd. or Fillister Hd. Cap 65¢ } given.

Wood—

List July 23, 1903.
Manufacturers' printed discounts:
Flat Head, Iron, 87¢@10¢@5¢
Round Head, Iron, 85¢@10¢@5¢
Flat Head, Brass, 85¢@10¢@5¢
Round Head, Brass, 80¢@10¢@5¢
Flat Head, Bronze, 77¢@10¢@5¢
Round Head, Bronze, 75¢@10¢@5¢
Drive Screws, 87¢@10¢@75¢

Scroll Saws—See Saws, Scroll.
Scythes— Per doz.
Clipper Pattern, Grass, \$4.25@5.00
Full Polished Clipper, \$4.75@5.50
Grain, \$7.00@7.50
Clipper, Grain, \$7.75@8.25
Weed and Bush, \$4.50@5.00

Seeders—Raisin—

Enterprise, 25¢@30¢

Sets—Aul and Tool Sets—

Wood Hdl., 10 Aul, doz. \$2.00@2.25
Wood Hdl., 15 Aul, 6 Tools,
doz. \$2.50@2.60

Allen's Sets, Aul and Tools:
No. 30, \$10.00, 50¢@10¢@10¢
Fray's Adj. Tool Hdl., No. 1, \$12; 2,
\$15; 3, \$12; 4, \$9; 5, \$7, 30¢
C. E. Jennings & Co.'s Model Tool
Holders, 30¢@10¢
Millers Falls Adj. Tool Hdl., No. 1,
\$12; No. 4, \$12; No. 5, \$15, 15¢@10¢
Stanley's Excelsior,
No. 1, \$7.50; No. 2, \$4.00; No. 3,
\$5.50, 30¢@30¢@10¢@10¢

Garden Tool Sets—

Ft. Madison, Three Pie, a Hoe, Rake
and Shovel, \$9.00

Nail—

Square, per gro. \$2.25@2.50
Round, Blk. and Pol., assorted,
gro. \$1.80@2.00

Octagon, gro. \$1.50@1.75
Black Brothers, 27¢
Canon's Diamond Point, \$1.15, 35¢
Mayhew's, 20¢
Saeil's Corrugated, Cup Pt. per gro. \$7.50
Saeil's Knurled, Cup Pt., per gro. \$7.50

Rivet—

Regular list, 70¢@10¢@75¢

Saw—

Allen's, 50¢@10¢
Criterion, 40¢
Adjustable, 40¢
Bemis & Call Co.'s, 40¢

Cross Cut, 30¢
Hammer, new Pat., 45¢
Plate, 40¢
Spring Hammer, 40¢

Diston's Star and Monarch, 50¢
Morrill's No. 1, \$15.00, 50¢
No. 3 and 4, Cross Cut, \$20.00, 50¢
No. 5, Mill, \$30.00, 50¢
No. 10, 11, 9¢@15¢
No. 1 Old Style, \$10.00, 50¢
Special, \$16.35, 50¢
Giant Royal, Cross Cut, \$20.00, 50¢
Royal Hand, \$20.00, 50¢
Taintor Positive, \$20.00, 50¢

Shaving—
Fox Shaving Sets, No. 30, per doz. \$24.00 net

Sharpeners, Knife—

Chicago Wheel & Mfg. Co., 63¢

Shaves Spoke—

Iron, doz. \$1.00@1.15
Wood, doz. \$1.75@2.00
Bailey's (Stanley R. & L. Co.),
20¢@10¢@10¢@10¢

Chapin-Stephens Co., 30¢@10¢@10¢@10¢
Goodell's, \$2.00, 15¢@10¢
Wood's F1 and F2, 50¢

Shears—

Cast Iron, 7 8 9 in.
Best, \$16.00 18.00 20.00 gro.
Good, \$13.00 15.00 17.00 gro.
Cheap, \$8.00 9.00 7.00 gro.
Straight, Trimmers, etc., 70¢@70¢@10¢
Best quality, Jap., 70¢@70¢@10¢
Nickel, 75¢@75¢@10¢
Fair qual. Jap., 75¢@75¢@10¢
Nickel, 75¢@75¢@10¢
Tailors' Shears, 40¢@40¢@10¢
Aome Cast Shears, 40¢@40¢@10¢
H. Inisch's Tailor's Shears, 40¢
Wilkinson's Hedve, 1900 list 40¢
Wilkinson's Branch, Lawn and Border,
40¢

Tinners' Snips—

Steel Blades, 50¢@50¢@10¢
Steel Laid Blades, 40¢@10¢@20¢
Forged Handles, Steel Blades, Berlin,
40¢@40¢@10¢

Heinisch's Snips, 40¢
Jennings & Griffin Mfg. Co.'s, 6¢ to 10
inch, 40¢@10¢@10¢
Ningara Snips, 40¢
P. S. & W. Co., 40¢
Triumph Pipe Shear, 40¢ doz. 2.40

Pruning Shears and Tools—

Cronk's Grape Shears, 33¢@35¢
Cronk's Pruning Shears, 33¢@35¢
Diston's Combined Pruning Hook,
33¢@35¢
and Saw, 40¢ doz. \$18.00, 25¢
Diston's Pruning Hook, 40¢ doz. \$12.00,
25¢

John T. Henry Mfg. Co.:
Pruning Shears, all grades, 40¢@40¢@5¢
Orange Shears, 30¢@10¢@30¢
Grape, 40¢@10¢@30¢
Tree Pruners, 75¢
P. S. & W. Co., 33¢@35¢

Sheaves—Sliding Door—

Stowell's Anti-Friction, 50¢
Patent Roller Hatfield's, Sargent's list,
70¢@10¢

Reading, 33¢
R. & E. list, 33¢
Wrightville Hatfield Pattern, 50¢

Sliding Shutter—

Reading list, 50¢
R. & E. list, 33¢
Sargent's list, 50¢@10¢

Shells—Shells, Empty—

Brass Shells, Empty:
First quality, all gauges, 60¢@5¢
Climax, Club, Rival, 10 and 12 gauge,
65¢@5¢

Paper Shells, Empty:
Acme, Ideal, Leader, New Rapid,
Magic 10, 12, 16 and 30 gauge, 5¢@5¢
Blue Rival, New Climax, Challenge,
Monarch, Dedance, Repeater, Yellow,
Rival, 10, 12, 16 and 30 gauge, 30¢
Climax, Union, League, New Rival,
10 and 12 gauge, 25¢
Climax, Union, League, New Rival,
14, 16 and 30 gauge (\$7.50 list), 50¢
Export, Metal Lined and Pigeon, 10,
12, 16 and 30 gauge, 33¢@25¢
Robin Hood, Low Brass, 20¢@10¢
Robin Hood, High Brass, 20¢@10¢

Shells, Loaded—

Loaded with Black Powder, 40¢
Loaded with Smokeless Powder,
medium grade, 40¢@10¢
Loaded with Smokeless Powder,
high grade, 40¢@10¢@10¢
Robin Hood Smokeless Powder:
Robin Hood, Low Brass, 50¢
Comets, High Brass, 50¢@10¢@5¢

Shoes Horse, Mule, &c.—

F. o. b., Pittsburgh:
Steel, per keg \$3.85
Steel, per keg 3.60
Burden's, all sizes, per keg, \$3.90

Shot—

Drop, up to B, 25-lb. bag, \$1.67
Drop, B and larger, per 25-lb. bag, \$1.85
Buck, 25-lb. bag, \$1.85
Chilled, 25-lb. bag, \$1.85

Shovels and Spades—

Association List, Nov. 15, 1903, 40¢

Sieves and Sifters—

Hunter's Imitation, gro. \$10.50@11.00
Buffalo Metallic, S. S. Co., \$1.00, \$1.20
14x16 16x18 18x20
\$13.20 \$13.50 \$14.40

National Mfg. Co.:
Victor, per gro. \$12.00
Surprise, per gro. \$11.00
No Name, per gro. \$11.00
Shaker Barley's Pat. Flour Sifters,
per doz. \$3.00, 30¢

Sieves, Tin Rim—

Per dozen.
Mesh, 14 16 18 20
Black, full size, \$1.20 1.25 1.30 1.35
Plated, full size, \$1.30 1.35 1.50 1.55
Black, scant, \$0.36 1.00 1.05

Sieves, Wooden Rim—

Nested, 10, 11 and 12 inch.
Mesh 18, Nested, doz. \$0.90@0.95
Mesh 20, Nested, doz. 1.00@1.05
Mesh 24, Nested, doz. 1.30@1.40

Sinks—

Standard list, 80¢@60¢@10¢
NOTE.—There is not entire uniformity
lists used by jobbers.

Skels, Wagon—

Cast Iron, 75¢@75¢@10¢
Steel, 40¢@40¢@10¢

Slates, School—

Factory Shipments.
"D" Slates, 60¢@10¢
Noiseless Slates, 60¢@5¢ tens

Slaw Cutters—See Cutters.**Slicers, Vegetable—**

Sterling No. 10, \$2.00, 33¢

Snaps, Harness—

German, 40¢@40¢@10¢
Corty Mfg. Co., 20¢@5¢@25¢
High Grade, 45¢
Jockey, 30¢@10¢
Trojan, 45¢
Yankee, 30¢@25¢
Yankee, Roller, 30¢@25¢
Covert's Saddlery Works:
German, 60¢
Model, 60¢
Triumph, 60¢
Onida Community, 60¢
Solid Swivel, 60¢
Sargent's Patent Guarded, 60¢@10¢

Snaths—

Scythe, 40¢

Snips, Tinners'—See Shears.**Spoons and Forks—****Silver Plated—**

Good Quality, 50¢@10¢@50¢@5¢
Cheap, 60¢@10¢@50¢@10¢
International Silver Co.,
1847 Rogers Bros. and Rogers & Hamil-
ton, 40¢@10¢
Rogers & Bro., William Rogers Eagle
Brand, 50¢@10¢
Anchor, Rogers Brand, 60¢
Wm. Rogers & Son, 60¢@10¢
Simeon L. & Geo. H. Rogers Co.,
Silver Plated Flat Ware, 60¢
No. 17 Silver Plated Ware, 60¢@10¢

Miscellaneous—

German Silver, 60¢@60¢@5¢
Cattaraugus Cutlery Co., 50¢
Yukon Silver, 50¢
Simeon L. & Geo. H. Rogers Co.,
German or Nickel Silver, Special list,
10¢@10¢

Tinned Iron—

Teas, per gro. 45¢@50¢
Tables, per gro. 90¢@1.00

Springs—Door—

Chicago (Coll), 40¢@10¢
Gem (Coll), 20¢
Relliance (Coll), 40¢@10¢
Star (Coll), 30¢
Torrer's Rod, 39 in., \$1.10
Victor (Coll), 54¢@10¢@10¢

Carriage, Wagon, &c.

1 1/4 in. and Wider:
Black or 1/4 Bright, lb., 14¢@5¢
Bright, lb., 14¢@5¢
Painted Seat Springs:
1 1/2 x 26, per pr., 50¢@55¢
1 1/2 x 2 x 28, per pr., 60¢@65¢
1 1/2 x 3 x 28 and narrower, per pr.,
80¢@85¢

Sprinklers, Lawn—

Enterprise, 25¢@30¢
Philadelphia No. 1, \$1.00, No. 2,
\$1.15; No. 3, \$1.40, 30¢

Squares—

Nickel plated, } List Jan. 5, 1900,
steel and iron, } 70¢@10¢@70¢@10¢
Rosewood Hdl. Try Squares and T-
Bevels, 60¢@10¢@70¢
Iron Hdl. Try Squares and T-Bevels,
40¢@10¢@40¢@10¢
Diston's Try Sq. and T-Bevels, 70¢
Winterbottom's Try and Miter, 40¢@10¢@40¢@10¢

Squeezers—Lemon—

Wood, Common, gro. No. 6, \$5.25
@5.50; No. 1, \$6.35@6.50.
Wood, Porcelain Lined,
Cheap, doz. \$1.00
Good Grade, doz. \$1.25
Tinned Iron, doz. \$0.75@1.25
Iron, Porcelain Lined, doz. \$1.75

Staples—

Barbed Blind, lb. 6¢@5¢
Electricians', Association list, 80¢@10¢@10¢
Fence Staples, Plain \$2.25; Galva-
nized, \$2.50
Poultry Netting, Staples, per lb.,
34¢@34¢
Grand Crossing Tack Co.'s list, 80¢@10¢

Steels, Butchers'—

Dick's, 30¢
Foster Bros., 30¢
C. & A. Hoffmann's, 40¢

Steelyards—

30¢@30¢@10¢

Stocks and Dies—

Blacksmith's, 50¢@50¢@10¢
Curtis Reversible Hatchet Die Stock, 25¢
Derby Screw Plates, 25¢
Gardner Die Stocks No. 1, 50¢
Gardner Die Stocks, larger sizes, 50¢
Green River, 25¢
Lightning Screw Plate, 25¢
Little Giant, 25¢
Reece's New Screw Plates, 25¢@30¢

Stone—

Chicago Wheel & Mfg. Co.:
Gem Corundum, 40 inch, \$3.00 per
gro., 12 inch, \$10.80
Norion Emery Scythe Stones:
Less than gro-s lots, per gro. \$9.00
One gross or more, per gro. \$7.20
Lots of 10 gross or more, per gro. \$6.00
Pike Mfg. Co. 1901 list:
Black Diamond S. S., per gro. \$12.00
Lamolle S. S., per gro. \$11.00
White Mountain S. S., per gro. \$9.00
Green Mountain S. S., per gro. \$8.50
Extra Indian Pond S. S., per gro. \$7.50
No. 1 Indian Pond S. S., per gro. \$7.00
No. 2 Indian Pond S. S., per gro. \$6.50
Leader Red End S. S., per gro. \$4.50
Balance of 1901 list 38¢@35¢

Oil Stones, &c.

Chicago Wheel & Mfg. Co., 1901 list:
Gem Corundum Oil, Double Grit, 50¢
Gem Corundum Oil, Single or Double
Grit, 35¢
Gem Corundum Slips, 55¢
Gem Corundum Slips, 55¢
Pike Mfg. Co. 1901 list:
Arkansas Stone, No. 1, \$10.50 in. \$2.50
Arkansas Stone, No. 1, \$10.50 in. \$2.50
Arkansas Slips No. 1, 50¢
Lily White Washita 4 to 8 in., 60¢
Rosey Red Washita 4 to 8 in., 60¢
Washita Stone, Extra, 4 to 8 in., 50¢
Washita Stone, No. 1, 4 to 8 in., 40¢
Washita Stone, No. 2, 4 to 8 in., 30¢
Lily White Slips, 90¢
Rosey Red Slips, 90¢
Washita Slips, Extra, 90¢
Washita Slips, No. 1, 70¢
India Oil Stones (entire list), 3¢@3¢

Hindostan No. 1, Regular, \$1.00

Hindostan No. 1 Small, \$1.00
Axe Stones (all kinds), \$1.00
Turkey Oil Stones, ex. 5 to 8 in., \$1.00
Queer Creek Stones, 4 to 8 in., 20¢
Queer Creek Slips, 40¢
Sand Stone, 5¢
Belgian, German and Swaty Razor
Hones, 5¢
Natural Grit Carving Knife Hones,
per doz., \$3.00
Quick Edge Pocket Knife Hones,
per doz., \$5.00
Mounted Kitchen Sand Stone, per
doz., \$1.50

Stoners—Cherry—

Enterprise, 25¢@30¢

Stops, Bench—

Millers Falls, 15¢@10¢
Morrill's, per doz. No. 1, \$10.00, 50¢
Morrill's, No. 2, \$12.50, 50¢
Whipple's Combination, per doz. \$2.50

Door—

Chapin-Stephens Co., 60¢@10¢

Plane—

Chapin-Stephens Co., 25¢

Straps—Box—

Cary's Universal, case lots, 20¢@10¢@10¢

Home—

Covert's Saddlery Works, 60¢@10¢

Stretchers, Carpet—

Cast Iron, Steel Points, doz. 55¢@60¢
Socket, doz. \$1.75
Excelsior Stretcher and Tack Hammer
Combined, per doz. \$4.00

Stuffers, Sausage—

Enterprise Mfg. Co., 25¢@25¢@74¢
National Specialty Mfg. Co., list Jan.
1, 1902, 30¢@5¢

Sweepers, Carpet—

National Sweeper Co., Per doz.
Auditorium, Roller Bearing (38 in.
case), Nickel, \$54.00
Mammoth, Roller Bearing (30 in case),
Nickel, \$60.00
Marion, Roller Bearing, regular
finishes, full Nickel, \$24.00
Marion Queen, Roller Bearing,
full Nickel, \$24.00
Monarch, Roller Bearing, Nickel, \$22.00
Monarch, Roller Bearing, Jap'ned, \$20.00
Transparent, Roller Bearing, Plate
Glass Top, Nickel, \$36.00
Monarch Extra, Roller Bearing,
(17-in case), Nickel, \$36.00
Monarch Extra, Roller Bearing (17-
inch case), Japanned, \$38.00
National Queen, Fancy Veneers, \$27.00
Perpetual, Regular Bearings, \$41.00
Perpetual, Regular Bearings, Jap'ned, \$45.00
Nora, Regulars: 30¢ per dozen on three-
dozen lots; \$1 per dozen on five-dozen
lots; \$2 per dozen on ten-dozen lots; \$2.50
per dozen on twenty-five-dozen lots.

Tacks, Brads, &c.—

List Jan. 15, '99,
Carpet Tacks, 90¢@10¢@10¢
American Cat Tacks, 90¢@10¢@10¢
Swedes Iron Tacks, 90¢@10¢@10¢
Swedes Upholsterers' Tacks, 90¢@10¢@10¢
Gimp Tacks, 90¢@10¢@10¢
Lace Tacks, 90¢@10¢@10¢
Trimmers' Tacks, 90¢@10¢@10¢
Looking Glass Tacks, 90¢@10¢@10¢
Bill Posters' and Railroad Tacks, 90¢@10¢@10¢
Hungarian Nails, 90¢@10¢@10¢
Common and Patent Brads, 90¢@10¢@10¢
Trunk and Clout Nails, 90¢@10¢@10¢
NOTE.—The above prices are for
Straight Weights. An extra 5% is given
Star Weights and an extra 10¢@10¢ on
Standard Weights.

Miscellaneous—

Double Pointed Tacks, 90¢@10¢@10¢
Steel Wire Brads, R. & E. Mfg. Co.'s list,
50¢@10¢@10¢

Tanks, Oil—

Each.
Emerald, S. S. & Co., 30-gal. \$3.25
Emerald, S. S. & Co., 60-gal. \$4.00
Queen City S. S. & Co., 60-gal. \$3.65
Queen City S. S. & Co., 60-gal. \$4.30

Tapes, Measuring—

American Asses' Skin, 40¢@10¢@50¢
Patent Leather, 25¢@10¢@5¢
Steel, 40¢@10¢@10¢
Chesterman's, 25¢@10¢@5¢
Eddy Asses' Skin, 40¢@10¢@5¢
Eddy Patent Leather, 25¢@10¢@5¢
Eddy Steel, 40¢@10¢@5¢
Kaufel & Esser Co., Steel and Metallic,
Lower list, 1899, 35¢
Lufkin's Steel, 30¢@10¢@5¢
Lufkin's Metallic, 30¢@10¢@5¢

Teeth, Harrow—

Steel Harrow Teeth, plain or headed,
1/2 inch and larger, per 100 lbs., \$5.00

Thermometers—

Tin Case, 80¢@10¢@30¢@10¢@5¢

Ties, Bale—Steel Wire.

Single Loop, 80¢@10¢
Monitor, Cross Head, Etc., 70¢

